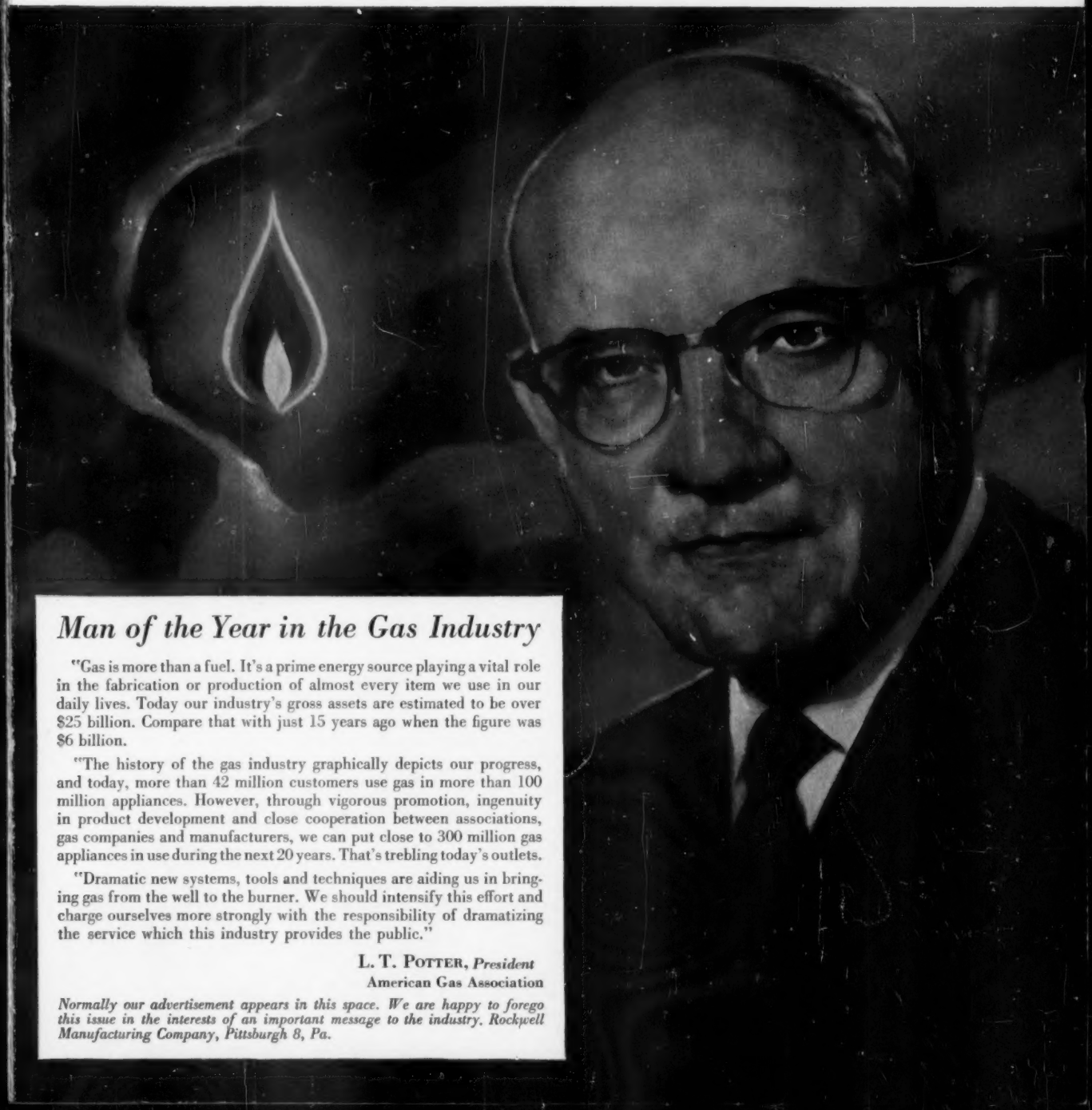
GAS

JANUARY 1961

Home safety . . 53
Helium 57
E. D. P. 97

A CHILTON PUBLICATION

THE NATION'S NATURAL GAS AUTHORITY



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American Gas Association

Normally our advertisement appears in this space. We are happy to forego this issue in the interests of an important message to the industry. Rockwell Manufacturing Company, Pittsburgh 8, Pa.

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GAS

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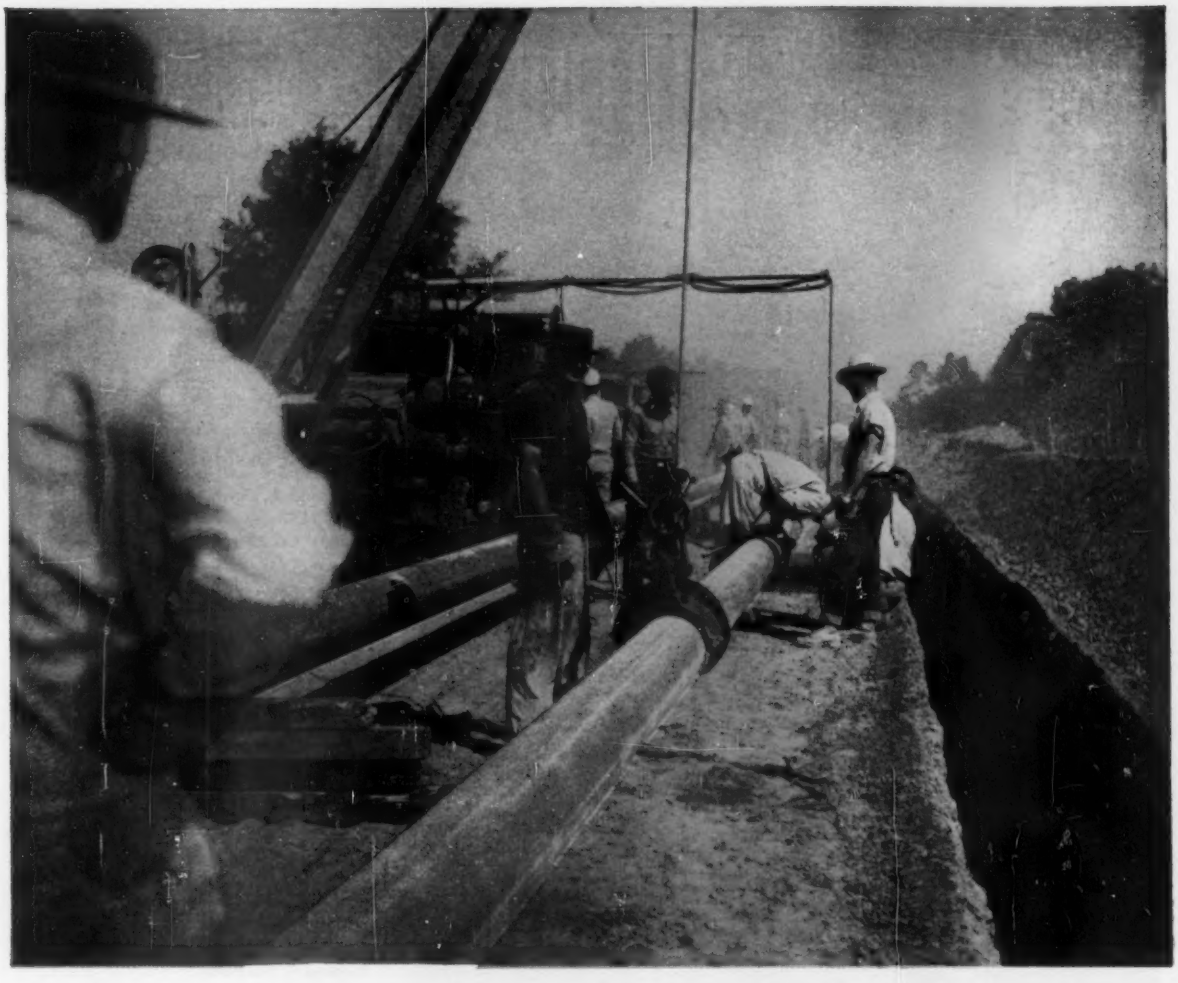
(Editorial offices: 198 S. Alvarado St., Los Angeles 57, Calif.)

BPA

Gas is published monthly. Copyright 1961 by Chilton Company, 56th and Chestnut Streets, Philadelphia 39, Pa. Subscription price: United States and possessions and Canada (in advance): one year, $2.00; two years, $3.00. Mexico, South and Central America, Caribbean Area: one year, $3.00; two years, $5.00. All other countries: $10 per year. Accepted as controlled circulation publication at Philadelphia, Pa. Members: Business Publication Audit of Circulation, Inc., National Business Publications, Inc. Gas is indexed regularly by Engineering Index Inc. The name "Gas" is registered U. S. Patent Office.

NBP



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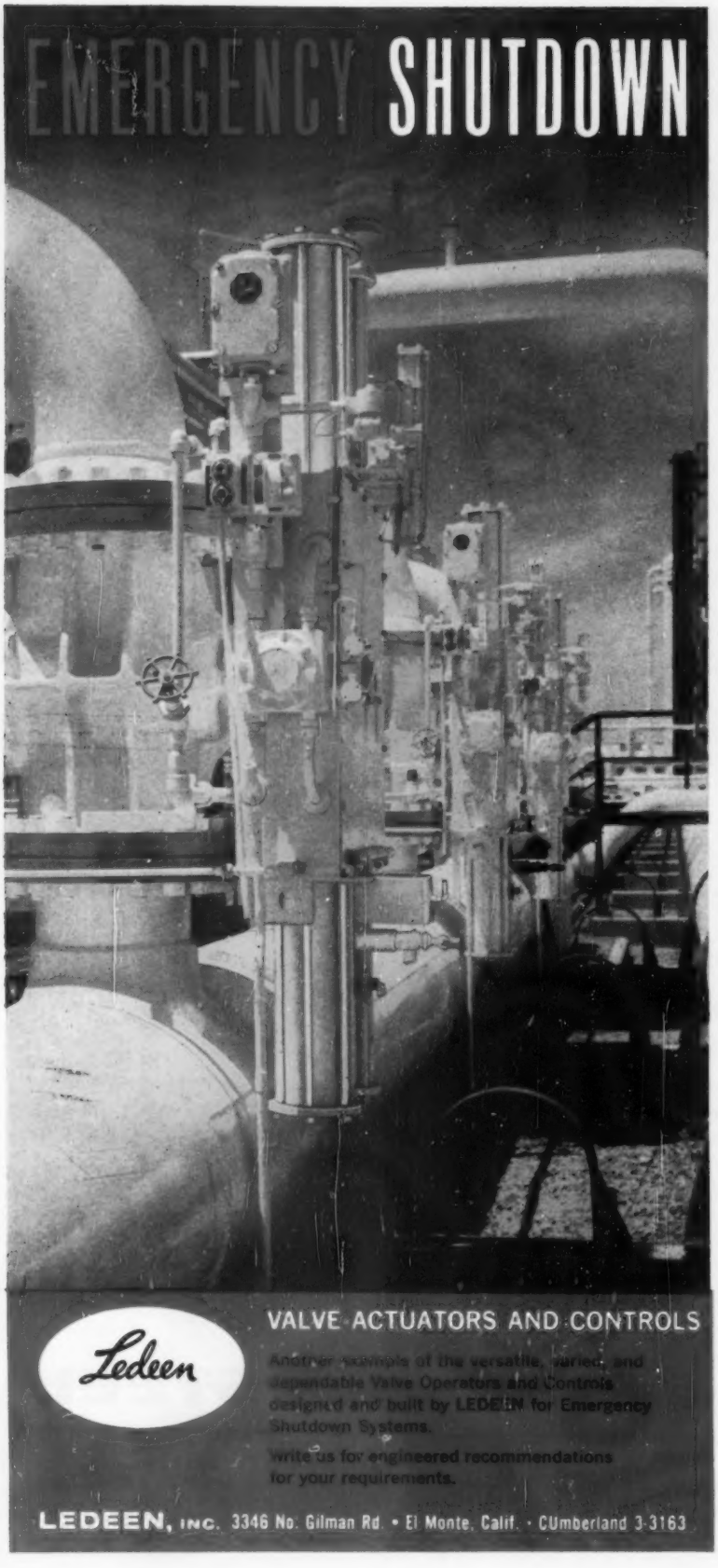
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CALENDAR

February

9-11..AGA Home Service Workshop — Cleveland - Sheraton Hotel, Cleveland, Ohio.

13-14..2nd Biennial Mid-Pacific Gas Merchandising Conference — Hawaiian Village Hotel, Honolulu.

23-24..PCGA, AGA, CGA Joint Public Relations Conference — Benson Hotel, Portland, Ore.

March

13-17..National Association of Corrosion Engineers Annual Meeting Hotel Statler, Buffalo.

16-17..New England Gas Association Annual Meeting — Statler-Hilton Hotel, Boston.

20-22..AGA General Management Section Conference—Frances-Marion Hotel, Charleston, S. C.

27-28..Mid-West Gas Association Annual Meeting — Sheraton-Fontenelle Hotel, Omaha.

April

4-5..Gas Compressor Institute—Liberal, Kan.

4-6..AGA Research & Utilization Conference—Sheraton Cleveland Hotel, Cleveland.

11-13..AGA Sales Conference on Industrial & Commercial Gas — Prince Edward, Windsor, Ont., Canada

13-15..GAMA Annual Meeting—Boca Raton, Fla.

18-20..Southwestern Gas Measurement Short Course — University of Oklahoma, North Campus, Norman, Okla.

24-26..Southern Gas Association Annual Meeting—New Orleans.

May

8-12..AGA Operating Section, Distribution & Production Conference —Sheraton Hotel, Philadelphia.

15-17..AGA MidWest Regional Gas Sales Conference — Edgewater Beach Hotel, Chicago

25-26..AGA Operating Section, Transmission Conference—Brown Palace and Cosmopolitan Hotel, Denver.

June

20-24..Canadian Gas Association Annual Meeting—Banff Springs, Alberta.

26-27..Michigan Gas Association Annual Meeting—Grand Hotel, Mackinac Island, Mich.

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for Vertical Angular and Horizontal Boring
KWIK-MIX COMPANY Ka-Mo Tools Dept., Port Washington, Wis.

Shows how to bore hole to 36″diameter with new speed, ease, accuracy

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The new H-140 offers greater economies in drilling horizontal, angular, and vertical holes than ever before possible. It has won wide acclaim as a safe and positive approach to installing casing under rail beds, streets, and highways . . . and in pre-boring holes for piling placement. H-140 drills dry . . . no water needed to flush material out of the hole.

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GAS

Thermally Thinking

JANUARY 1961

Area prices—and another subject

DURING 1960, our gas industry was gifted with FPC's Statement of General Policy Number 61-1. We feel 61-1's area prices concept is a significant step in a desirable direction.

Importantly, it shows dedication to the truth that field prices to natural gas producers must be adequate to generate necessary future supplies.

In several writings, FPC indicated 61-1 is a standard to which field prices might rise without specific proof of justness and reasonableness.

But, 61-1 price "standards" appear similar to the "rubber yardstick" (From SoCal's Gale Sandusky) and the "elastic cubic foot" (from Ebdon) of alleged standards for gas measurement. For, FPC also has graced its standards with reminders that they are subject to change and do not become final determinations.

If the regulatory agency and gas industry are to place reliance on standards that will not be very specific at all, it is hard to visualize much progress toward clearing the backlog which can be eliminated, FPC has said, if its staff size is tripled, by the year 2043—a year during which most of us, if still dynamic, will be pushing the record Methuselah put in the books.

I am further confused by a two-price concept for a single commodity.

The gas industry does have different prices now under old and new contracts. And lack of incentive under old lowest-price contracts is not conducive to bringing new gas out of the ground. If the two-price system is interim, only, and there is a transition to a single price for each area, perhaps FPC has given our industry a valuable.

One can also question the logic for geographical boundaries for pricing areas. Suggestions that geological, economic, and operating criteria have more validity, are compelling.

So, while an area-prices concept is just great, there is not too much indication that succor is at hand. We see little hope for fewer problems from area pricing than were experienced with the defunct cost-of-service method.

We know FPC is trying, and trying hard, to solve these problems. We can only offer our support of progress and wish them well. The task is very close to impossible. Rewards to the conscientious in public service are meager.

Now comes to this picture John F. Kennedy, "King of the New Frontier." He has flushed talent from Harvard Law School and diverse liberalistic lairs. Will the approach of slant-domed intellectuals solve regulatory problems?

For the new Administration, with our regards, is a definition of "liberal" as supplied to us by Rep. Clare Hoffman—"LIBERAL, n. One who is liberal in thought or principles; one who favors greater freedom in political or religious matters."

On another subject

From time to time letters arrive from gas company people asking if we are interested in an article they have in mind for publication in GAS. Some almost seem apologetic for bothering us with such a matter.

To start 1961, may I say that feature story pages of GAS Magazine are always open to any and all articles and story ideas from any gas company person. We welcome, in fact, solicit, articles that you gasmen feel you would like to write. Also we appreciate any story suggestions you have.

Further, for those articles and technical papers, written for exclusive publication in GAS, and which we do publish, GAS awards a cash honorarium to the author—provided he is an employee of a gas company.

There are over 200,000 gas company employees in the U. S. While we would like to, we can't practically visit or write all of you. So, please feel you are personally invited to get in touch with the Eastern Editor Bill Harper (56th & Chestnut Sts., Philadelphia 39, Pa.), or Bob Clay or ole' Ebdon (198 S. Alvarado, Los Angeles 57, Calif.) about publication of stories you want to write, or papers you have written, or subjects you would like to see someone write a feature story on.

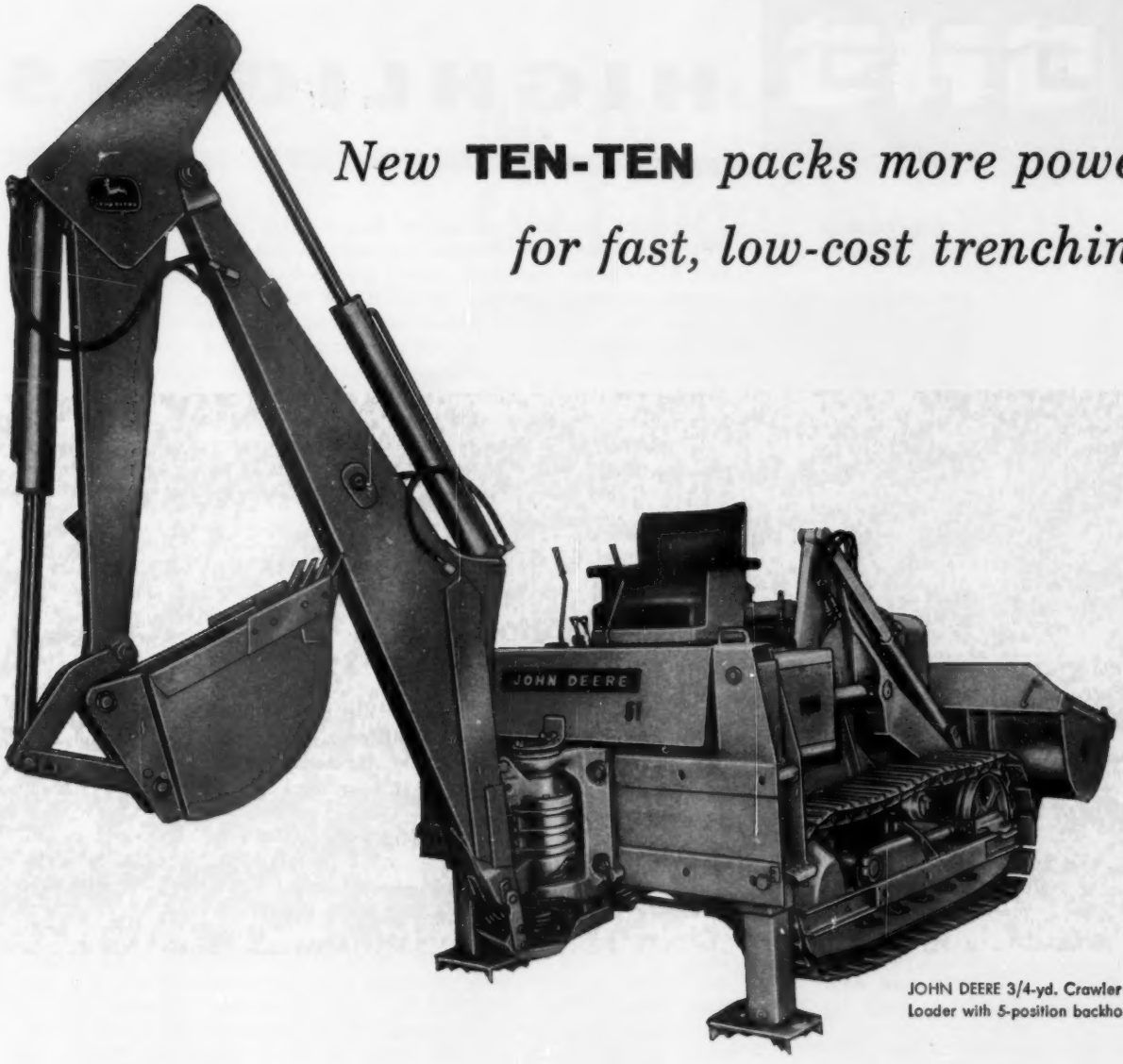
Actually, we like to hear from you about anything you see in GAS that you like or don't like.

We hope the Christmas Season was inspirational. And we send you our best wishes for a really fine 1961.

J. Fred Ebdon

EDITOR

New **TEN-TEN** *packs more power for fast, low-cost trenching*



JOHN DEERE 3/4-yd. Crawler Loader with 5-position backhoe.

Now there's forty engine horsepower behind the controls of the John Deere Backhoe—smooth-handling power for efficient, on-schedule construction of gathering lines, mains, feeders and services. With either Diesel or gasoline engine, you get the benefits of John Deere's 4-cylinder, 4-cycle, valve-in-head design, with an optional new wet-clutch and hydraulic direction reverser.

Two John Deere Backhoes meet every trenching need. The five-position 51 centers or slides to flush left or right mountings for digging next to walls, fences or buildings. Both the 51 and the center-mounted 50 operate with simple two-lever control, and have individually adjusted stabilizers. Backhoe-Loaders, Backhoe-Dozers, and Crawler-Dozers with Sidebooms are standard John Deere units preferred for utility construction work.

Complete specifications are available through the John Deere construction equipment dealer. He is ready to provide information, too, on long-term leasing arrangements now available.

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BACKHOES
AND
CONSTRUCTION
EQUIPMENT

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GAS HIGHLIGHTS

Confidential to Kennedy

A blueprint, probably calling for future sharp increases in power for FPC (and other such agencies) has been handed to the new Administration. Study of the regulatory agency system was made by James McCauley Landis, a federal regulator for FDR and former dean of Harvard Law School. The Confidential Report was given Pres.-elect Kennedy in mid-December by Landis—an avowed supporter of tougher centralized federal control of utilities. He favors super agencies to handle regulatory functions. One instance, cited by the presidential advisor during Congressional hearings in early December, is the need for "a sort of ministry of fuels," which could set policies in areas which are now overlapping. He also favors increasing terms of FPC (and other commissions) to 10 years from the present three, and increasing decision-making powers, prestige, and salaries of hearing examiners.

Enchilada Inch advances

California Gas Transmission Co., a Los Angeles-based, new subsidiary of Tennessee Gas Transmission Co., filed with the California PUC for authorization to construct and operate the in-California part of the proposed Enchilada Inch gas pipeline. CGT's only customer, to date, Southern California Edison Co. (Los Angeles), which proposes to take up to 455 MMcfd (eventually) of CGT gas for its electric power generating plants, filed a companion application as a gas purchaser and user.

The over-all Texas-Old Mexico-California gas pipeline project is planned as a 1592-mile, $225 million system. The Dec. 5, '60 filing by CGT-SoCalEd involves 292 miles and 10,000 compressor hp of this, at a cost of around $50 million.

Pacific Lighting Corp. (San Francisco), through its operating subsidiaries, Southern California and Southern Counties Gas companies (both of Los Angeles), will vigorously oppose the plan when it comes before the PUC. (Details, pp. 74 and 122.)

IOCC to study NFP and APR

The Interstate Oil Compact Commission, in its December meeting, authorized formation of a special committee to study possible effects of a proposed National Fuels Policy and the "area pricing rule" for natural gas on conservation programs administered by member states. The five-man committee will be appointed by Gov. Price Daniel of Texas, new chairman of IOCC.

New peak shaving plant for Minneapolis Gas

A huge new refrigerated LPG storage facility will be in operation by June 1961 for peak shaving service at Minneapolis Gas Co. A double-walled tank will hold 120,000 bbl of propane at −50 deg F (equivalent to 137,500 bbl at 60 deg). Refrigerated storage should cut unit costs on propane storage by about 75 per cent.

Hinshaw Amendment seems to work

When the Natural Gas Act was changed by the Hinshaw Amendment (March 1954), the Congress heard that it would cost gas consumers millions of dollars. FPC reports six years later that it has not received a single complaint that the amendment was inequitable.

NI-Gas grows

Northern Illinois Gas Co. (Aurora, Ill.) announced plans for a new $2 million office building that will house most of the utility's general office functions. It will be located on a 112-acre site near Aurora. NI-Gas' 700-man general office force is now officed in buildings in both Bellwood and Aurora, and in rented properties. The new building will consolidate them for operating efficiency. Also, a new electronic billing and EDP system will be housed in the new facility to handle NI-Gas' more than 700,000 customers.

NEW

up-to-the-minute technical bulletin!

From the leading producer/ supplier of Gas Odorants

Oronite's completely revised technical bulletin provides you with the latest knowledge on odorization. Such things as odorizers, handling of odorants, line conditioning, corrosion, soil adsorption and methods of checking odor intensity are detailed in this new bulletin. This information and much more is available now—just contact the Oronite office nearest you and request Oronite's new Gas Odorant bulletin.

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NEW HANDLEY INDUSTRIES

lifetime pipeline markers and sign posts . . .

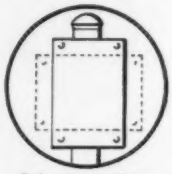
Never need painting. Won't rust or shatter!

This new, non-metallic* pipeline sign post saves money three ways. Chemically bonded color eliminates painting maintenance. The posts are light and easy to handle and store, come conveniently packaged 5 to a container. And they're sturdy, even gun shots won't shatter them.

Equally important, both pipeline markers and sign posts can be designed to meet your specific requirements. Marker posts and side-mounted sign posts may be equipped with cathodic terminal caps or vent caps. Climbers may also be added.

A 5" square foot piece is solvent-welded to the bottom of the post to prevent rotation. It anchors the post securely in the ground.

IT WILL PAY YOU TO GET THE FACTS FROM HANDLEY INDUSTRIES. WRITE TODAY.



Side-mounted sign, (vertical or horizontal). Front view shown above.

Top-mounted pipeline sign post (vertical or horizontal). *Rear view shown above.*

Marker Post with cap

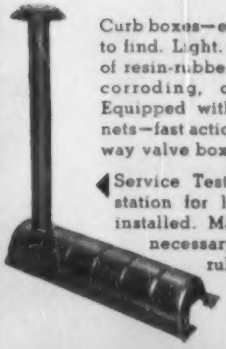
Marker Post with vent cap

Cathodic terminal cap for pipeline marker post

End call backs with attractive HI outside meter boxes. Available as shown, or for recessed installation. Made of tough resin-rubber compound*.

Master Poly-Trol *automatic* gas shut-off valve. Shuts-off gas in event of over-pressure, underpressure, excessive high temperature, and flooding. Serves also as a tamper-proof manual shut-off.

HI Cathodic Terminal Box Landscape engineered, and non-corroding*. Leads are attached to the terminal block in the cap for easy testing.



Curb boxes—extension-type. Easy to find. Light. Tough. Safe. Made of resin-rubber compound*. Non-corroding, collapsible type. Equipped with permanent magnets—fast action on finders. Roadway valve boxes also available.

Service Test Station. Provides a test station for leak surveys. Permanently installed. Makes random probing unnecessary. Made of tough resin-rubber compound*.

specifications:

Post Length: 7' (other sizes available on request)

Post Diameter: 3½"

Wall Thickness: 3/16".

**A. B. S. Polymer*

HANDLEY INDUSTRIES, INC.

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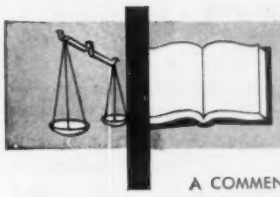


Regulatory and Legislative Trends

A COMMENTARY ON NATIONAL AND STATE DEVELOPMENTS BY AN EXPERT IN UTILITY LAW

Interstate commerce rules gas producers

A KENTUCKY court reversed the Kentucky Public Service Commission and ruled that a local natural gas producer was subject to Federal Power Commission's exclusive regulation, because most of its gas was sold in interstate commerce. The state commission had tried to compel the producer to sell gas to a Kentucky distributor for utilization by citizens of Kentucky. There is at least one benefit from the court's decision. It eliminates duplicate state and FPC regulation of a gas producer who sells commingled gas at wholesale in both interstate and intrastate commerce. Moreover, the producer's facilities were all inside the state of Kentucky. The court's reasoning will be enlightening to management, so let us review it.

• Scope of the Natural Gas Act

The producer claimed that FPC has sole power to control its wholesale activities and the disposition of all natural gas produced by it. Reference was made to the Natural Gas Act provision which reads:

"The provisions of this chapter shall apply to the transportation of natural gas in interstate commerce, to the sale in interstate commerce of natural gas for resale for ultimate public consumption * * * and to natural-gas companies engaged in such transportation or sale, but shall not apply to any other transportation or sale of natural gas * * * or to the production or gathering of natural gas."

The court was impressed by the legislative history of the Natural Gas Act in Congress. It was influenced by the testimony in hearings urging that Congress could not provide any price protection for natural gas unless the government controlled the prices of all companies that cooperate in transporting the gas from the producing wells to the ultimate consumer. The Kentucky court also honored this statement by the United States Supreme Court in the famous Phillips Petroleum Co. case:

"We believe that the legislative history indicates a Congressional intent to give the commission jurisdiction over the rates of all wholesales of natural gas in interstate commerce, whether by a pipeline company or not and whether occurring before, during, or after transmission by an interstate pipeline company."

When gas starts a journey in interstate commerce it keeps that classification even though ownership of the various segments of the pipeline network changes custody of the gas many times. That is why a producer whose facilities are confined to one state can still engage in interstate commerce if his gas flows, without interruption, to another state for use.

The Kentucky court relied on a United States Court of Appeals decision in the Deep South Oil Co. case. It pointed out that where gas from a seller's wells continuously flowed into a gathering system of a purchasing company, and became a part of a mass of gas which moved from the gathering system into a processing plant, and from there to both interstate and intrastate destinations, the sales of the gas at the well were not local sales, but were sales in "interstate commerce." Those producer sales were within the meaning of the section of the Natural Gas Act defining a natural gas company as a person engaged in the transportation of natural gas in interstate commerce.

In answer to the contention that the exemption in the Natural Gas Act for production or gathering of natural gas freed the producer's sale, the Court used another precedent. That Interstate Natural Gas Co. decision establishing the precedent declared ". . . it (the Natural Gas Act) used language removing from any doubt that the commission (FPC) was not to have jurisdiction over properties used for production and local distribution or the activities of production and gathering. It did this by expressly providing that the act should not apply 'to the facilities used for such (i.e. local) distribution or to the production or gathering of natural gas.'" The Federal Court then elaborated on this statement in these words: "The exemption of production and gathering merely means that the physical activities, facilities, and properties used by petitioner in the production and g a t h e r i n g of natural gas are not within the commission's (FPC's) power of regulation."

Based on those federal decisions, the Kentucky court declared that the producer's commingled gas was destined in great part for consumption beyond Kentucky's boundaries and that "the conclusion is inescapable that all its gas moves in interstate commerce."

The Kentucky Public Service Commission tenaciously claimed that the portion of the producer's gas used in Kentucky justified separation of that volume for state regulation. That contention was rejected by reliance upon another federal decision saying:

"The record shows that the business of the complainant is a closely integrated transportation system

Continued on next page

Want to sell gas lights?

. . . Taking an order

Then follow the lead of Western Kentucky Gas Co., Owensboro, which sold 529 gas lights on one special day.

Nov. 3 was designated Gaslite Day and Western Kentucky's 364 employees were instructed to ask at least 10 people to buy a light. District managers held brief employee meetings on the afternoon preceding the big day. Two meetings were held on the actual day to check progress.

Final totals, recorded by 9 a.m. on Nov. 4, listed 4786 contacts and 529 sales—an average of 13.1 contacts per employee and one sale for every nine contacts.

Most of the sales were Arkla Cabildo, Embassy, and Flair models, priced — installed — at $39.50, $44.50 and $49.50 respectively.

On a year-around basis, Western Kentucky employees receive a flat $2.50 commission for each gas light sold, and there was no special or extra incentive for sales on Gaslite Day. The only advertising was in two districts where radio spots were used to check results.

Frank Cassada, Western Kentucky's sales supervisor, reports that ". . . about 25 per cent of our meters are in an area with TVA power — 120 gas lights were sold by the districts in that area."

Top honors went to Amos Veazey in the company's Hopkinsville district. He made 55 sales. President G. J. Tankersley personally accounted for 10 sales.

. . . the finishing touches

which is fundamentally and predominantly interstate in character from beginning to end. In structure and operation, such continuity exists throughout the system that regulation at one point or control of a single activity would necessarily affect the whole structure. The sale and delivery of gas at wholesale from the interstate pipeline to local distributing companies is an integral part of the major enterprise, commerce between the states. Under such circumstances, regulation in the public interest is national rather than local, demanding a standard of uniformity unattainable except through a single paramount authority."

• United States Constitution

The commerce clause of the United States Constitution does not permit divided authority in the federal regulatory field.

The highest court in the land has proclaimed that wherever the interstate and intrastate transactions are so related that the regulation of one involves the control of the other, it is Congress that is entitled to prescribe the dominant rule.

• FPC jurisdiction

Natural gas producers now know that FPC regulation of transportation or wholesales in interstate commerce is dominant even when part of the gas is ultimately used in the state of origin. They also know that once they have made sales of natural gas in interstate commerce for resale that they cannot discontinue deliveries without FPC authorization. That is the result, regardless of the terms of the producers' sales contracts.

The remaining source of relief for natural gas producers is legislation to change the Natural Gas Act. FPC and the courts will not voluntarily relax control of producers. It is too late for natural gas producers to obtain exemption from FPC regulation by new legislation. They have, however, a good chance for legislation that will permit FPC to fix the price for producers' gas on a sensible and practicable basis. ■

More *profit*-ability from Robertshaw

Robertshaw controls up-grade gas range sales!

It's no secret . . . the quickest way to higher profits is to up-grade the sale. And the place to begin . . . sell Robertshaw control features that let ranges do more than cook!

Robertshaw FLAME SET,® the newest "*burner-with-a-brain*" means:

- no more burned pans
- small flame for small pans
- simplest to operate
- no more scorched food
- BIG flame for BIG pans
- no instructions needed

Robertshaw FLAME MASTER® means full oven control for cooking and baking, *plus* these low temperature features:

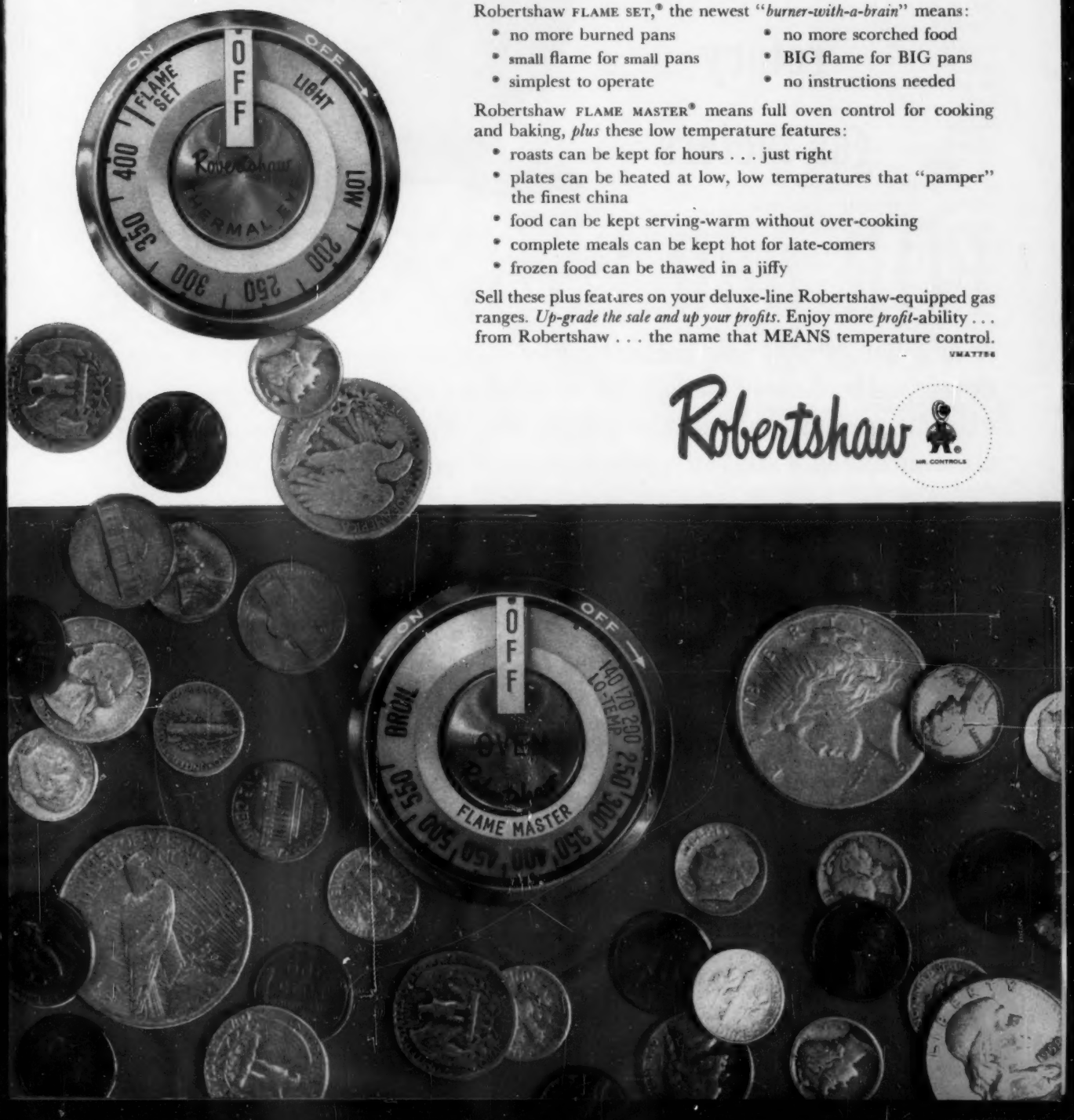
- roasts can be kept for hours . . . just right
- plates can be heated at low, low temperatures that "pamper" the finest china
- food can be kept serving-warm without over-cooking
- complete meals can be kept hot for late-comers
- frozen food can be thawed in a jiffy

Sell these plus features on your deluxe-line Robertshaw-equipped gas ranges. *Up-grade the sale and up your profits.* Enjoy more *profit*-ability . . . from Robertshaw . . . the name that MEANS temperature control.

VMAT756

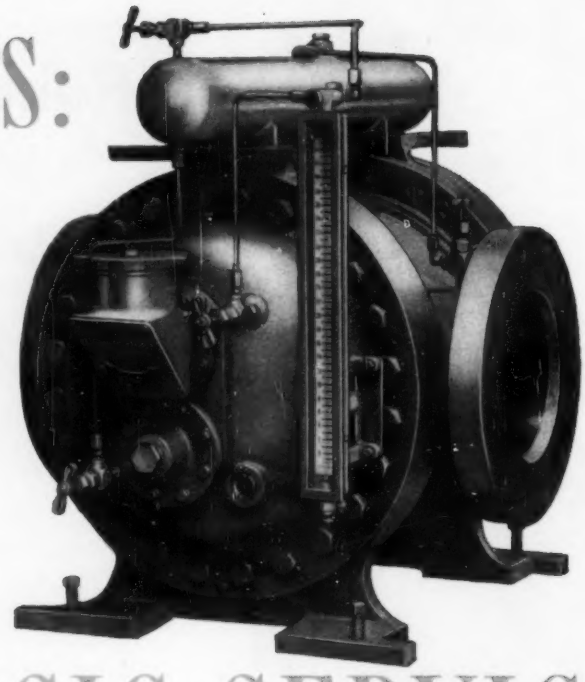
Robertshaw

MR. CONTROLS



R-C PRESENTS:

a new line of high-pressure rotary gas meters



FOR 600 PSIG SERVICE

A new line of 600 psig rotary positive displacement gas meters has been developed by Roots-Connersville to serve the needs of industries requiring extreme measurement accuracy in the higher pressure ranges. The meters are available in 4 sizes covering a range of from 84,000 to 1,600,000 scfh.

THIS NEW METER LINE IS IDEAL FOR MANY APPLICATIONS:

- City Gate Metering
- Transmission Line Metering
- Process Gas Metering
- Chemical Gas Manufacturing
- Gas Lifting
- Compressor Stations
- Well Head Measurements
- Steel Mills
- Underground Storage
- Metering of pulsating flow and surges, H2, 02, C02, NH3, LP gas, NO, He, C2H2, etc.

R-C rotary gas meters require an absolute minimum of maintenance . . . assure almost complete freedom from wear . . . exceptionally high accuracy in metering. A refinement of the basic R-C rotary-positive design which has proved its dependability over the years. These new meters for 600 psig service have incorporated simple in-the-line mounting, straight through flow . . . high-speed gears . . . and a welded steel outer case enclosing a steel inner cylinder. Throughout their extra wide operating range, these new R-C meters assure greater accuracy and improved performance in handling a wide variety of gases.

The development of this new meter is another example of R-C's specialized experience of more than 100 years in the design and application of air and gas handling equipment.

Write us for additional information and data sheets about these new Roots-Connersville meters for 600 psig service.

ROOTS-CONNERSVILLE BLOWER
DIVISION OF DRESSER INDUSTRIES, INC.
161 Oregon Ave., Connersville, Indiana. In Canada—629 Adelaide St., W., Toronto

TECHNICAL TRENDS

By GUY CORFIELD
Professional Engineer,
Los Angeles

Squeezing heating values out of natural gas

As is generally known, natural gas as distributed for fuel consists predominantly of methane with lesser amounts of ethane, smaller quantities of propane and butane, and traces of pentane, hexane, etc. The propane-butane "fraction" is known commercially and in the oil industry as liquid petroleum gas (LPG) and the pentane plus fraction is referred to in the oil industry as natural gasoline.

These residual fractions remain in the natural gas because it has heretofore not been feasible to completely remove or "strip" them. It is normally not economical to remove them if they are present at a concentration of less than about half a gallon of liquid per Mcf of "wet" (unprocessed) gas. However, they are, in overall hydrocarbon utilization, more valuable for special use or as petrochemical or refinery raw material, than as components of natural gas for fuel, and their virtually complete economic recovery is being given increasing attention.

There are several ways in which varying degrees of partial removal are accomplished. The easiest but least complete way is to cool the gas under pressure which causes the heavier fractions to condense out as liquid. The most commonly used method is by absorption; the gas is scrubbed with a light oil called absorption oil, in which the LPG and natural gasoline dissolve; these fractions are then stripped out of the oil by heat and steam, and condensed and separated as desired. A third way is by refrigeration, liquefaction and distillation, which is a more complex and effective but much more expensive modification of the cooling method mentioned first.

One of the most recent innovations is the use of solid adsorbents such as silica gel and activated alumina and activated carbon. These materials have been used for many years to remove water vapor from natural gas. Gas is passed through the bed of granular material which adsorbs the water vapor. When the adsorptive capacity is reached, gas flow is switched to another unit and the first bed is regenerated (water driven out) by heat. The alternation can be continued indefinitely. By modifying this process, very complete removal of the natural gasoline and LPG fractions can also be accomplished. There are reports of successful stripping of gas with initial gasoline and LPG content as low as 0.137 gal. per Mcf; also reports of two-phase stripping where the natural gasoline is first removed by silica gel and the LPG then removed by activated carbon.

This is a trend that is of considerable interest to natural gas utilities, from the standpoint of heating value of the gas after final release for fuel. The heating values of the various hydrocarbons (standard cubic feet, dry basis) are approximately as follows:

Methane	1010
Ethane	1785
Propane	2570
Butane	3370
Pentane	4000
Hexane	4700

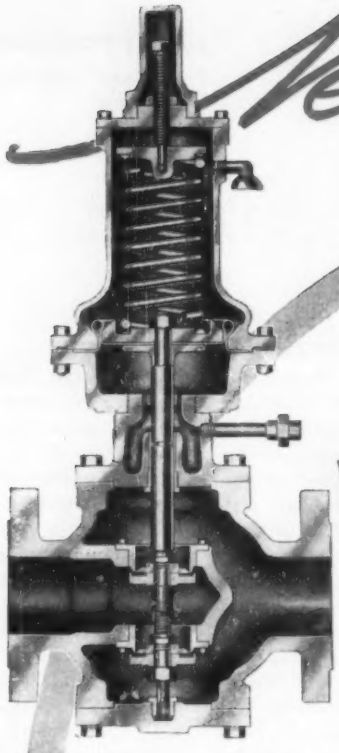
As the higher hydrocarbons become more valuable for petrochemical feed stock and other uses, more attention will no doubt be given to their removal. There is even the likelihood that ethane removal will become generally profitable. This would result in a residual natural gas that would be practically pure methane (plus any small percentages of inerts — carbon dioxide, nitrogen and helium—that might be contained). Thus the heating value would be not higher than 1010 Btu (dry basis) per Scf. Fortunately the gravity also lowers as the higher hydrocarbons are removed, so that the proportionately larger volumes required for a given application would be proportionately easier to "push" through the carrying lines and burner orifices.

Beryllium oxide

One of the newest materials that the space age is developing is beryllium oxide (BeO). Its properties make it particularly useful for many of the exacting services of modern technology. Its melting point is 4650 deg F which is well up among the highest temperature resistant refractories, while its weight is much less than most. It has high heat resistance and electrical insulating value, like a ceramic, but also high thermal conductivity like a metal. It is extremely hard (close to diamond) and abrasion resistant, and extremely resistant to thermal shock (can be repeatedly heated to redness and plunged into ice water).

Obviously some of these properties bring it under careful scrutiny as a material for nose cones of space ships, and exhaust ports for rockets, jet engines and turbines. It has many potential uses in miniaturized electronic assemblies. It can be used as insulating material for high temperature thermocouples, and for tubing and special shapes in sampling super-hot liquids and gases. In cast and molded forms it can find a place as high temperature laboratory ware. It can also be foamed or produced as fibers, and in this latter form has been suggested as a material for long life gas light mantles.

Like many new materials, production techniques are in the development stage, and size and cost are limiting factors in the use of BeO. Shapes cannot be made larger than 5 in. wide or thick or 24 in. long, and costs are high compared to more conventional super-refractories. According to the National Beryllia Corp., North Bergen, N. J., these limitations, however, are expected to decrease in the near future.



SIZE: 2"—3"—4"—6"
125 lb. iron—W. P. 175 psi
250 lb. ductile—W. P. 400 psi
Series 30 steel—W. P. 720 psi

New in principle!

CHAPLIN-FULTON

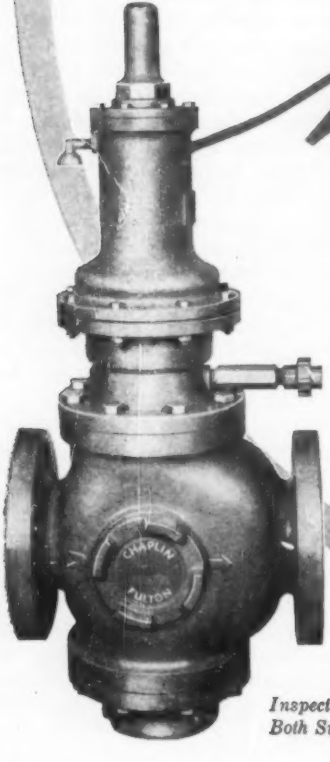
MODEL 441-57S

GAS REGULATOR

Model 57-S, a simple spring loaded regulator, operates on a new diaphragm principle which will control accurately until the regulator is wide open. The outlet pressure "fall-off," typical of spring regulators, is eliminated—not by an uncontrolled velocity effect—but by a diaphragm which changes its size as the valve moves to give straight line control. For pounds-to-pounds service,—controlled pressures to 75 psi with same assembly.

New in design!

Also, a new body design—441—with gas exit areas greatly enlarged to prevent turbulence and increase capacity.
And to help in your visual inspection program—side inspection plates on *both* sides of the body have been included. Screwed-on with O-ring seal, they can be quickly removed and replaced—no gasket problem. Standard face-to-face dimensions now make the 441 interchangeable with other regulators.



Inspection Plates Both Sides.

ACCURATE CP MFG CO DEPENDABLE

Chaplin-Fulton
MANUFACTURING COMPANY
Pittsburgh 25, Pennsylvania

59-2

WASHINGTON

By NEIL REGEIMBAL

GAS Washington Bureau
1093 National Press Bldg.
Washington 4, D. C.

The new Administration and the gas industry

THE new Democratic Administration takes office this month and plans swift moves to drastically change the patterns of the past eight years.

President Kennedy, replacing the Eisenhower staff system at the White House with a family "kitchen cabinet," is showing strong indications of following the course and using the maneuvers of President Franklin D. Roosevelt's New Deal.

Although there isn't likely to be any repetition of the famous "100 days" of the first few months of the Roosevelt Administration, the new President will make a determined bid to push many of his legislative proposals through Congress early in the new session of Congress, well-knowing that his prestige will never be higher than just after his first election.

There has been some speculation that President Kennedy, because of his family background, his schooling, and his personal traits, is in fact a conservative and will show this after he takes office. This can be discounted. His record over more than a decade in both houses of Congress shows no indication of any split with the ultra-liberal philosophy.

The plans and activities of his top advisors since the election even more concretely discredit any chance for a "conservative" Democratic administration.

One of his first steps will be top-to-bottom reshuffling of government personnel—not only the cabinet and the few top officers, but far down into the ranks of the Civil Service Employees. The axe will fall from the Defense Department to the regulatory agencies such as the Federal Power Commission.

The new President will be a tough, determined personal power, much like FDR. Whether he'll go as far as trying to pack the U. S. Supreme Court is doubtful. But he'll build his own Administration and in the process a solid, disciplined government of his own party eager to do his bidding and one that will be entrenched for his successor as Democratic nominee eight years from now.

In Congress, in spite of a nominal loss of seats by the Democrats, the outlook again is for strong White House control. While the Republican-Southern conservative coalition has been strengthened in numbers, and will operate in some cases to block or water down really extreme Kennedy proposals, it will not operate as often. Democratic members of Congress will be far less eager to bolt the party now that it controls all-important patronage.

First tipoff to what the new administration will mean to the gas industry will come fairly early when the new President sets about filling two vacancies on the Federal Power Commission. One seat is now vacant. The other is held by Paul A. Sweeney under a recess appointment. Although Sweeney is a Democrat, he was not confirmed by the Democratic Congress last year and presumably will be replaced by a more "party-indoctrinated" candidate.

In June, the new Administration will have a chance to make a third appointment when the term of Republican Arthur Kline expires.

This will quickly give the Democrats three of the five seats on the commission. Republican Chairman Jerome K. Kuykendall will finish his term in 1962, and Frederick Stueck, also a Republican, finishes his term in 1964.

It has been assumed because there was no criticism during the campaign, that the Democrats have no quarrel with the new area pricing formula recently set by the FPC. But this is not necessarily true. Several northern liberal Democrats, and spokesmen for organized labor, who claim they gave the new President his slim majority, in private tell another story. "It's simply the Harris natural gas bill by administrative action" one long-time and powerful foe of the gas bill says.

We were told to hold off during the campaign, another adds, because the ticket needed the votes from gas-producing states, and Vice President Lyndon Johnson was trying to get them.

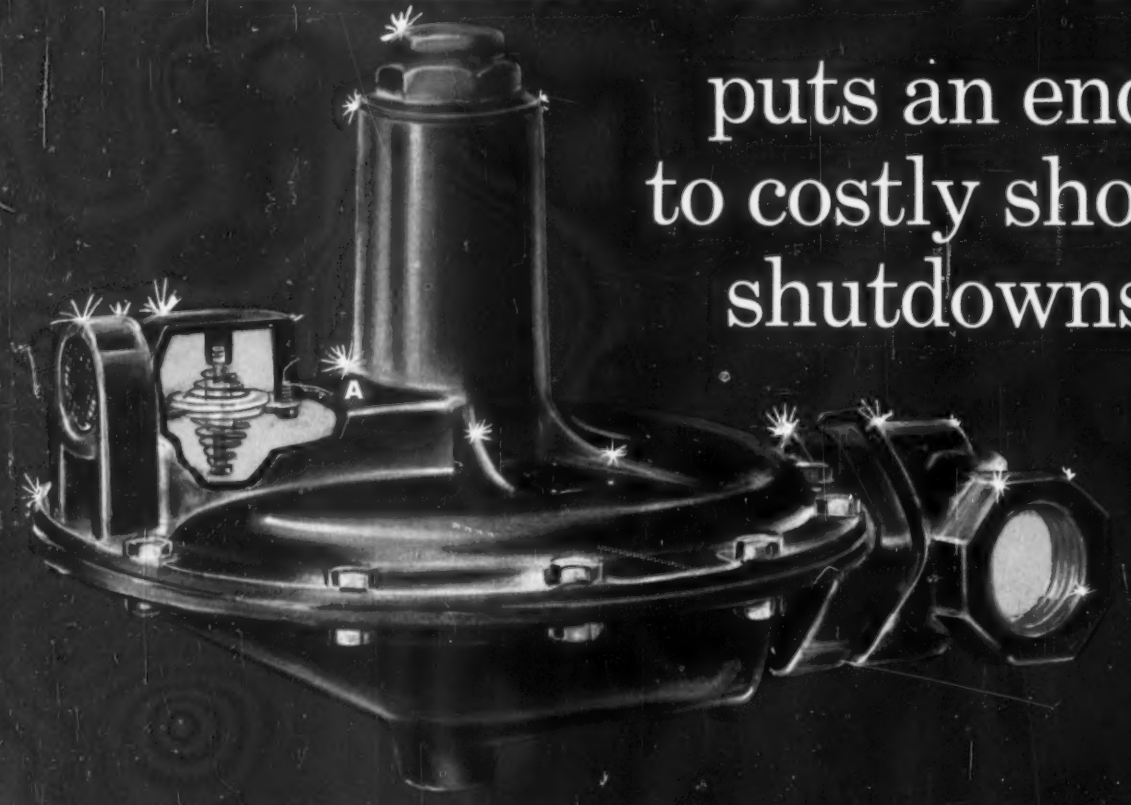
These sources haven't yet determined whether they'll attempt an all-out drive to block the area-pricing plan, either in Congress or by insisting that it be withdrawn or sharply modified by further administrative action of the FPC. They want it knocked down. Whether they succeed, and how, will be up to the new Vice President, who will keep control of the Senate while Speaker Sam Rayburn (D., Texas) retains his iron-fisted control over the House.

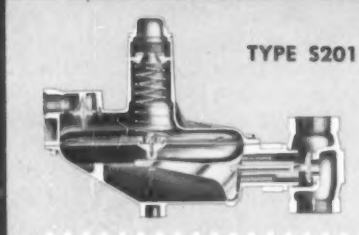
Continued on page 134

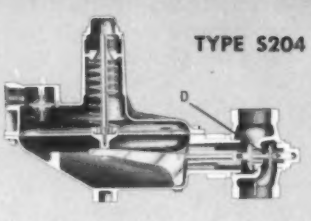
Remarkable, New Regulator

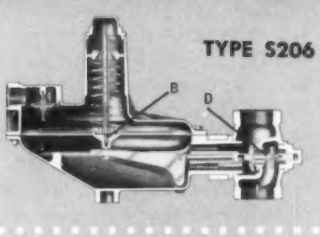
FISHER S200

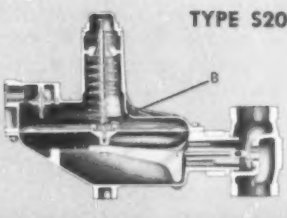
puts an end to costly shock shutdowns

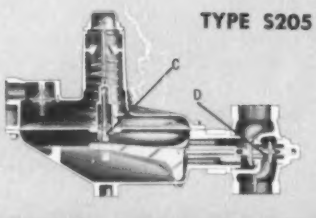


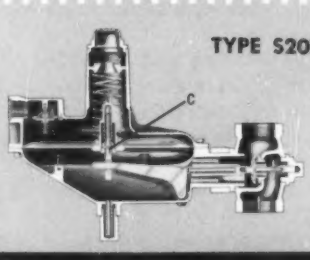












the ideal regulator for Commerical and Industrial applications

A completely new design, Fisher S200 high capacity, light weight regulators are ideal for commercial and industrial applications where flow rates may change rapidly. The S200 incorporates a combination of shock protection and safety devices never before offered in any high capacity regulator.

A INSTANT RESPONSE . . . This new regulator series provides unmatched stability of operation under shock load conditions, even where demand variation is from practically nothing to several thousand CFH. Instant diaphragm response is assured by the exclusive two-way Fisher Stabilizer Vent Valve (see the cutaway illustration at left). This feature permits rapid expelling or drawing-in of air to diaphragm casing when abrupt diaphragm movement is demanded. Diaphragm lag is effectively eliminated. New Fisher Turbo-Booster Tube, open throat type inlet, provides instant registration of pressure changes on underside of diaphragm. Because of these exclusive features, the Fisher S200 holds shock pressures . . . either negative or positive . . . to limits that will not unnecessarily actuate safety equipment.

B INTERNAL RELIEF . . . Type S202 and S206 regulators have an internal relief valve which protects against over-pressure caused by partial malfunction of the regulator. Relief valve functions when downstream pressure exceeds regulator setting by 10" WC to 1 psi, depending on spring. See small illustration of Types S202 and S206.

C HIGH PRESSURE SHUT-OFF . . . When downstream pressure exceeds regulator setting by 13" WC to 1½ psi (depending on spring used), High Outlet Pressure Shut-Off trips and shuts off gas flow completely. This feature available on Types S205 and S207.

D LOW PRESSURE SHUT-OFF . . . Should inlet pressure fall to a point incapable of maintaining suitable outlet pressure, Low Outlet Pressure Shut-Off shuts off gas flow immediately. This feature available on Types S204, S205 and S206.

TYPE S201 . . . Outstanding feature of S201 is the exclusive, new Fisher two-way stabilizer vent valve. This device is also incorporated in design of all regulators in S200 series.

TYPE S202 . . . Has internal relief. Although not full capacity relief, valve functions at 10" WC to 1 psi over setting (depends on spring) and relieves until excess pressure is dissipated.

TYPE S204 . . . Incorporates low outlet pressure shut-off. On this type regulator, pusher post in spring casing is provided to permit manual resetting of regulator.

TYPE S205 . . . Identical to S204 except that it also includes high outlet pressure shut-off. This is reset manually, by removing closing cap and pulling upward on pusher post extension.

TYPE S206 . . . Internal relief valve and low outlet pressure shut-off. Low pressure shut-off is reset by removing closing cap and pulling upward on pusher post extension in spring case.

TYPE S207 . . . High outlet pressure shut-off is reset by removing cap at bottom of casing and pushing stem upward. Low pressure shut-off omitted to assure service even with low inlet pressures.

PRESSURE RANGE DATA

Type Number	Orifice Size Available	Inlet Press. Range PSI	Outlet Press. Range
S201 and S202	¼", ⅜" ½", ¾" 1", 1⅜6"	½ to 100	3½" WC to 3¼ psi
S204 and S206	⅝", 1" 1⅜6"	½ to 75	3½" WC to 3¼ psi
S205 and S207	⅝", 1" 1⅜6"	½ to 30	3½" WC to 3¼ psi

Write today for full information on this outstanding new regulator series. Ask for Bulletin No. P-S200.

IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD . . . CHANCES ARE IT'S CONTROLLED BY . . .

FISHER GOVERNOR COMPANY

Marshalltown, Iowa / Woodstock, Ontario / Rochester, England

BUTTERFLY VALVE DIVISION: CONTINENTAL EQUIP. CO., CORAOPOLIS, PA.

FISHER®

SINCE 1880

Put it on paper

By MARSHALL E. PARKER
Consulting Engineer
Houston

THE title above may soon be obsolete—in fact, it is already obsolete in some quarters, but the principle behind it is valid. This principle is that facts should be put on record. It is really not much of an exaggeration to say that *all* the facts pertinent to any business should be permanently recorded somewhere. It is certainly true that any single fact may cause extra expense sometime, somewhere, if it is not recorded.

Although it is probably not actually true, sometimes it seems to be traditional in the oil and gas industries to depend upon memory for the exact location of valves, piping, insulated joints, and other small details of the system. In the course of time this comes to mean depending upon the memories of the "old timers" who are still with the company, and it is often found that these memories are not entirely accurate; there also comes the day, quite suddenly, when there are no more old timers left.

A common fault is the failure to maintain an adequate history of the construction and modification of facilities. It is easy to find, in the engineering files, a report submitted some years ago recommending the installation of such and such a cathodic protection system. Not one scrap of paper can be found which tells whether or not the system was ever installed. Perhaps in the accounting files a record may be found of an order to install it, and a record of its having been paid for. But there should be present, in the engineering files, the answers to three questions: (1) was the system installed; (2) was it installed exactly as described in the report; and (3) has it subsequently been modified? Not only should all these be present, but they should be there in unequivocal form.

The only way to have an unequivocal negative answer to one of the above questions is to have, in one place—preferably on one sheet of paper—a complete chronological history of all that has ever been done within a given area. This need be no more than a skeletal list of items, with references to the letters, reports, drawings, and other sources of more complete data:

MIDVALE 8" LATERAL

168 miles—coated—
Built April, 1955; alinement dwgs. 1366-1399 incl.
Current requirement survey and cathodic protection system design March 28, 1956
Rectifier-ground bed system installed, August 1956
Adjustive survey Oct. 23, 1956
Ground bed No. 2 enlarged, April 3, 1957
Survey, Oct. 7, 1957
Survey, Sept. 28, 1958
Rectifier No. 3 repaired, June 10, 1958
Survey Oct. 12, 1958

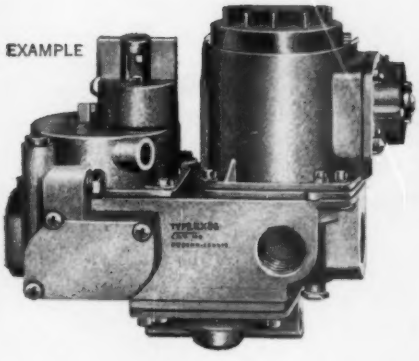
The list above is entirely adequate, except for one thing — it makes no reference to the existence of a set of monthly rectifier readings, which, in themselves comprise a sort of history. In a recent instance, the writer would have been saved at least two days' work had a history such as this been available.

Field notes, too, often leave much to be desired. Worse are notes which are limited to the actual readings taken; which lack headings, dates, weather notes, identification of personnel and instrumentation, and even lack accurate identification of locations of readings. There are a great number of things which may be relevant to any particular survey, and it is perhaps asking too much to insist that all relevant data be included. Certain minimum information, however, can legitimately be required. In addition to the items mentioned above, corrosion surveys have their own peculiar demands. Pipe-to-soil potential measurements, for example, should always carry a clear indication of the electrode position. Instrumentation should be shown; this is very important for potentials of all kinds, and for current measurements by IR drop, either in the line itself or in shunts. By instrumentation is meant not only the identification of the instrument used, but how it was used; some combination instruments can be used in several ways. When soil resistivities are taken by the Wenner or four-pin method, the pin spacing must be indicated on each set of notes.

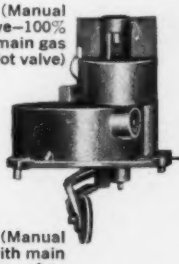
A general rule for the critical inspection of notes for completeness is that they should be just as easily used by an equally competent engineer as by the one who took them.

Original field notes should always be preserved! This is much more important than is commonly realized. For only if we have the original notes can we be free from doubt, free from the fear that some simple little error of copying has crept in. The preservation of original field notes is a legal requirement in those phases of surveying which are legally controlled; this is solely because of the recognition of their importance. Copies may have been made at any time, by any person, and for any reason. It is a mistake to think that a set of soiled notes should be "cleaned up" by being copied. If parts of them are so soiled as to be nearly illegible, then supplementary notes can be made and attached to the originals. This procedure is often justified, and may involve a complete rearrangement of the notes; there is nothing wrong with this, but the originals should be preserved. ■

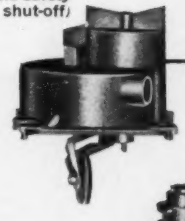
versatile Versatrol



EXAMPLE

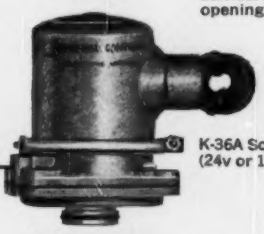


MR-50 (Manual reset valve—100% safety, main gas cock, pilot valve)

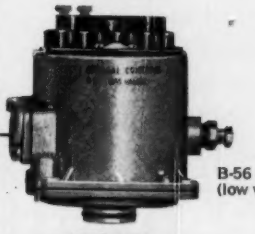


MR-80 (Manual reset with main line safety shut-off)

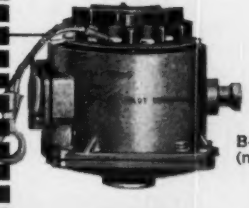
K-36H Hydranoid (Silent, silicone cushion with standard or step opening)



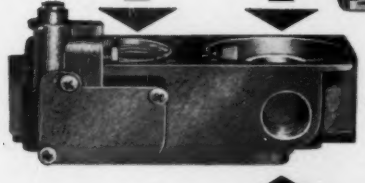
K-36A Solenoid (24v or 120v)



B-56 Diaphragm (low voltage)



B-66 Diaphragm (millivoltage)



BASIC

V305D Regulator (Single seat)

V305C Regulator ("Hi-Flo" type)

Get every combination you want from a basic Versatrol combination gas valve. It consists of valve body and main line safety shut-off. Main gas cock, pilot valve, and 100% safety are optional. You take your choice from four valve inlets and outlets (straight thru, bottom, 90 degrees left or right).

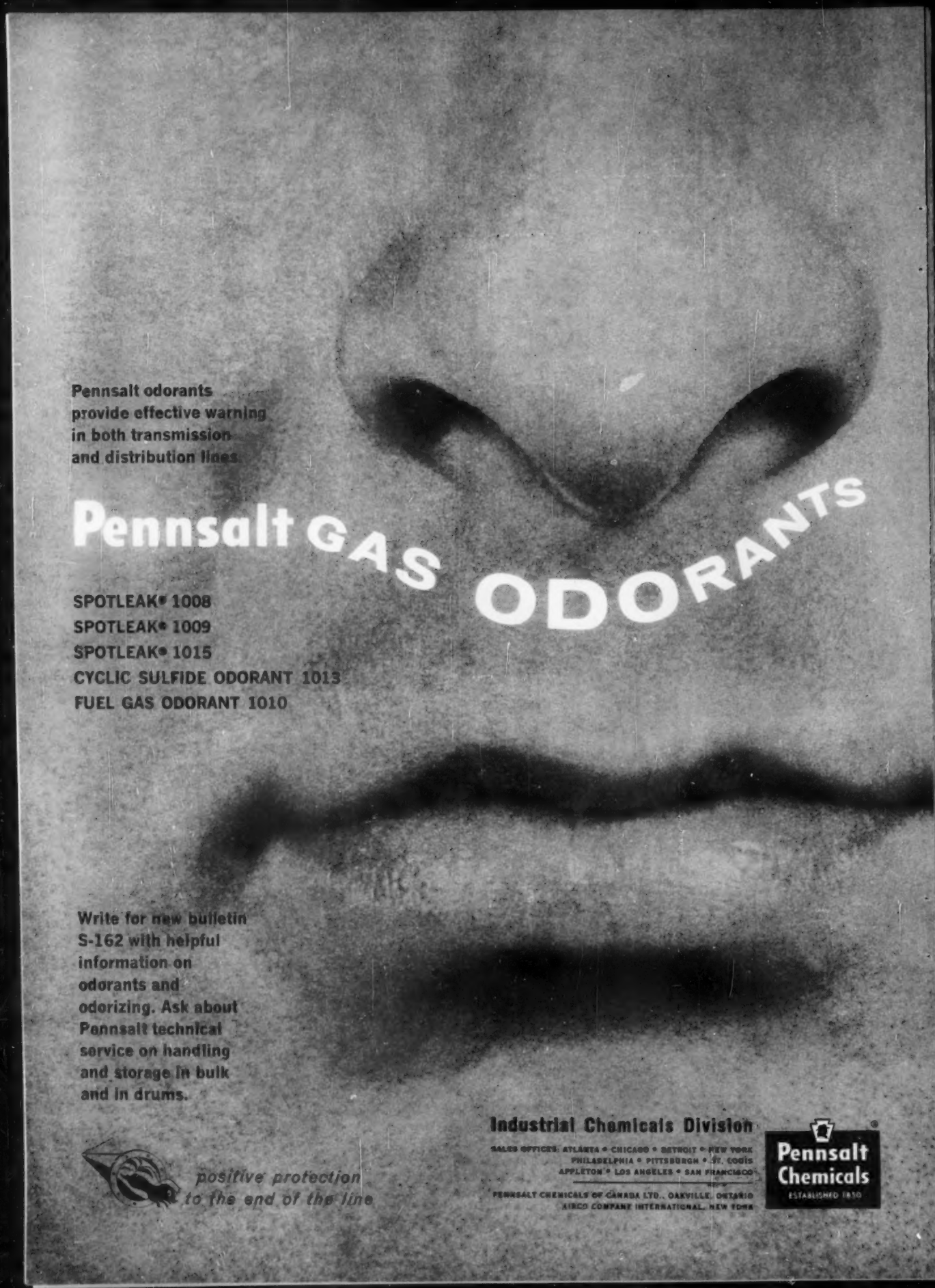
You can add a gas pressure regulator, if needed. Choose from a wide selection of automatic valve actuators . . . Solenoids (standard or Dial-A-Flo models), Hydranoids, Diaphragm Type—for either line voltage, low voltage, or millivoltage applications. All elements are independently removable and interchangeable with only a screwdriver—an exclusive advantage for both the installer or serviceman. Versatile VERSATROL—another advance design from General Controls.

GENERAL CONTROLS

Automatic Controls for Product or Process

Glendale, Calif. • Skokie, Ill. • Guelph, Ontario, Canada

Nine plants—44 factory branch offices serving the United States, Canada and Western Europe


Pennsalt odorants provide effective warning in both transmission and distribution lines
Pennsalt GAS ODORANTS
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SPOTLEAK® 1009
SPOTLEAK® 1015
CYCLIC SULFIDE ODORANT 1013
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Write for new bulletin S-162 with helpful information on odorants and odorizing. Ask about Pennsalt technical service on handling and storage in bulk and in drums.
positive protection to the end of the line
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Pennsalt Chemicals
ESTABLISHED 1850

THE GASSING GAME

By JIM CLARK • Gas & Oil Consultant, Houston

FEW organizations in the history of any industry have met with the sudden and almost total acceptance of a new group of gasmen that was merely suggested about a month ago by Clinton S. Drake of Lion Oil Co. in Houston.

The group is known as the Natural Gas Men of Houston. Its founders believe it could be the beginning of a new and important association of natural gasmen that could sweep the gas industry, although that is not its purpose.

When Drake first informally suggested that such an organization be formed, he simply had in mind that Houston was something of a center of all phases of the natural gas industry and that it would be a good idea for responsible men in the industry to meet and discuss mutual problems.

About a month ago there was an information meeting which was attended by 13 men. A week or so later, 35 gasmen met and formed the charter group. In the last week of November, the organization had already grown to more than 100 in number and applications were still pouring in.

Harold E. Vaughan, assistant to the vice president for supply of Transcontinental Gas Pipe Line Corp., was elected the first president. A week later it was announced that the plan of the group was to have two sections. One of these sections would be composed of marketing, transmission, and distribution men. The other section would comprise production and processing men. Each section would be called a chapter. Each would hold monthly luncheon meetings.

Early in December it was announced that the marketing, transmission, and distribution chapter would be headed by W. D. Yale of Texaco with D. J. Mayhall of Superior Oil Co. as sub-chairman. The producers and processors chapter will be presided over by Clinton Drake of Lion Oil, the man who can well be called the founder of the organization. His sub-chairman will be J. W. Mims of Phillips Petroleum.

Purposes of the new natural gas organization are to improve the skill and knowledge of gasmen, to provide a forum, and to improve public understanding of the industry. The chapters will deal with technical as well as non-technical subjects. Membership will be limited to men in responsible positions with companies which perform one of the functions in the natural gas industry covered by the two chapter headings.

It has been pointed out that members of the organization do not speak for their companies. Their objective is improvement of the industry as a whole.

So overwhelming has been the acceptance of Drake's idea that first announcement brought inquiries from several important areas. The first two came from Dallas and Tulsa. Others have been received from Los Angeles, Denver, and other important producing, marketing, distribution, and transmission areas of the country.

No plans have been made to make the organization national in scope but the organizers will not say they would not welcome such a development. It has been demonstrated in the past that wide and dangerous areas of misunderstanding between the various segments of the natural gas industry exist. Steps are being taken by various committees of the several natural gas and petroleum associations to bring about understanding, particularly in the field of natural gas legislation.

This is not the goal of the Houston group, but it could well be included as a possible matter for study and discussion, one of the leaders said. But, it was pointed out, this will be a Simon-Pure organization in that it will be influenced by no selfish interests of any segment of the industry.

It has been estimated that there are at least 300 or 400 potential qualified men holding responsible positions with companies in the Houston area who are eligible for membership. If the first month's progress is any indication, most of those should be in the organization within another three to six months.

This is one of the most interesting new organizational developments in either the natural gas or petroleum industry and its progress will be followed closely in the big gas country that surrounds Houston. So far, there has been no organization in the area composed of responsible gasmen from whom the public could get anything except company viewpoints on natural gas subjects.

Possibly this organization will fill an acknowledged need to the public and the press as well as to the industry. ■

Corvan features 1,800-lb. load capacity!

CHEVY'S CORVAIR 95 TRUCKS

DRIVER'S UP FRONT... ENGINE'S IN THE REAR AND ALL THE REST IS WORK SPACE!

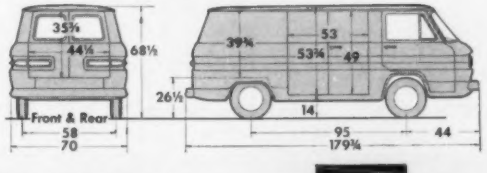
■ Open a Corvan's wide double doors and see how easily that load compartment can be adapted to your type of utility operation. There's ideal work space for installation, repair or cable splicing equipment. Enough capacity to hold 1,800 lbs. of tools and materials in an area that's 120″ long, 58.6″ wide and 53.7″ high at the center! That's more space than you get in a half-ton panel, and it's more accessible, too. Opens from the right side *and* the rear, with additional left-side doors available at extra cost.

■ Open the engine compartment in the rear and you'll see where this one does its saving. That thrifty air-cooled power plant never uses water or antifreeze; never requires new hose connections or radiator repairs. You can count on quick warmup, too.

■ Could be one of the Corvair 95 pickups would work even better on your operation. Like the Corvan, they have 4-wheel independent suspension, one-piece body-frame construction and a highly maneuverable 95-inch wheelbase. Talk to your dealer—choose the model that fits your specific fleet needs. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

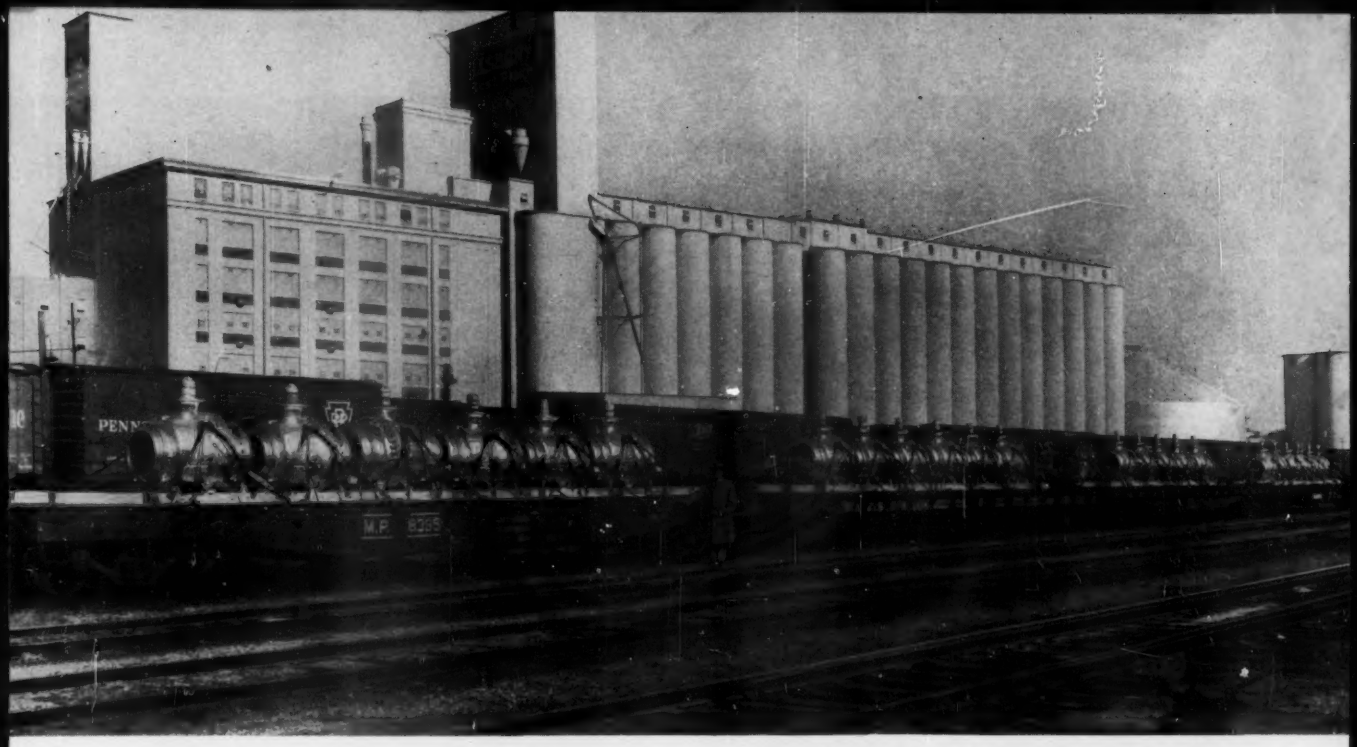
SPECIFICATIONS

AXLE, REAR: ratio 3.89. **BRAKES:** hydraulic, front and rear 11″ x 2″; lining area 167 sq. in. **CLUTCH:** 9⅛″ dia. **DIRECTIONAL SIGNALS:** front and rear. **ENGINE:** Turbo-Air Six; 80 hp; 145-cu.-in. displacement. **FUEL TANK:** capacity 18½ gallons. **GVW:** 4,600-lb. maximum. **SPRINGS:** coil, front and rear, each with 1,150-lb. capacity. **STEERING:** ball-gear, ratio 20:1. **SUSPENSION:** independent front and rear, each with 2,500-lb. capacity. **TIRES:** five tubeless 7.00-14/4PR. **TRANSMISSION:** 3-speed synchro-mesh. **WINDSHIELD WIPERS:** dual electric; single speed. **EXTRA-COST OPTIONS** include Powerglide or 4-speed synchro-mesh transmission; a choice of 14 two-tone color combinations; plus dealer installed comfort and convenience features.



A NATURAL FOR FLEET DUTY!

CHEVROLET



Flat carloads of Rockwell Hypresphere valves ready for shipment to a western gas transmission company.

ACCEPTANCE: BY THE TRAINLOAD

The trainload of Rockwell Hypresphere lubricated spherical plug valves (above) is dramatic evidence of the immediate acceptance of this valve by oil and gas pipeline engineers. Introduced just a little over a year ago (after three years of rugged field testing) the Hypresphere has been specified on most of the big, new pipeline jobs. Why?

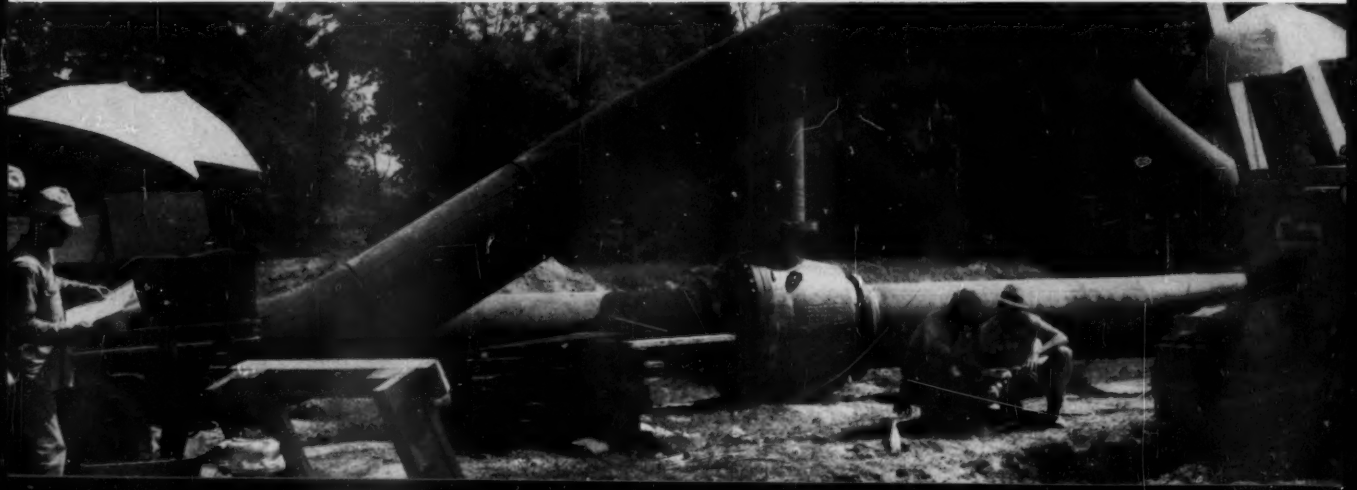
The Hypresphere gives pipeline engineers all of the advantages of a lubricated plug valve (positive shut-off, easy operation, faster closure and lubricant economy) with a full round port opening. Also, the Hypresphere is far more compact than non-lubricated valves of equivalent size and pressure rating. Why not get full details plus information on the *complete* line of Rockwell-Nordstrom standard and Hypreseal lubricated plug valves. *Write: Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited; Rockwell International, S.A., Geneva, Switzerland.*

ROCKWELL-Nordstrom VALVES

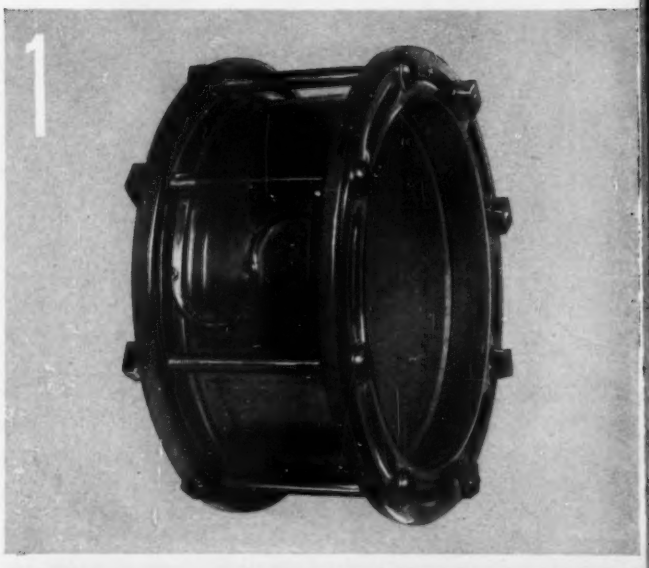
another fine product by

ROCKWELL

Rockwell Hypresphere ready for underground installation. Note compact size for 30-inch valve.



6 SHORT STEPS TO GREATER SERVICE IN GAS DISTRIBUTION



1. Coupling mains and service lines is simple, effective and saves you money. Take a Dresser® Style 123 factory-assembled pre-coated coupling. Initial cost is low...but the economies just start here. 2. Now take the man who makes the joint. That's right, it takes only one man—with a minimum of instruction and supervision—to make gas tight joints with the best of them. And at the rate of 2 bolts a minute. 3. Here you see part of the reason why Dresser couplings save time in the ditch. Note the pipe being stabbed into the pre-coated coupling. The complete coupling is clad in 3 coat protection —prime, coal tar epoxy resin bonded under glossy black coal tar enamel. No mess and time wasted on coating and priming hard to get at places. 4. Tightening-up the bolts to make the actual joint is quick and uncomplicated. No precision equipment to pamper, no need for protective gear...in fact the only necessary equipment is a wrench. 5. One pan of soapy water is all that's needed to check the tightened joint. No elaborate testing devices. Just paint it on and check for bubbles. It's as simple as that. 6. Last the connection gets a quick touch-up and the joint is done...ready to "live" in the ground taking the worst that weather, ground settlement, vibration and line pressure can offer.

Dresser couplings save you money. Initial cost is low and maintenance and repair problems are simplified or eliminated. They save valuable time because they're precoated and assembled, quick and easy to install even when there's not much elbow room. Entire systems can be coupled right in the ditch with no need for tricky lowering of pre-joined lengths and the expensive equipment involved. ■ Economical gas distribution, construction and repair calls for couplings and repair products developed specifically for the gas industry. This has always been Dresser's prime business. Your Dresser man has any information you need on the complete Dresser line. Serving the gas industry is his only business, and, he is qualified, and eager to assist you in every way. DRESSER MANUFACTURING DIVISION, 61 Fisher Avenue, Bradford, Pennsylvania.

dmd

DRESSER

MANUFACTURING DIVISION
BRADFORD, PENNSYLVANIA

DRESSER INDUSTRIES, INC.
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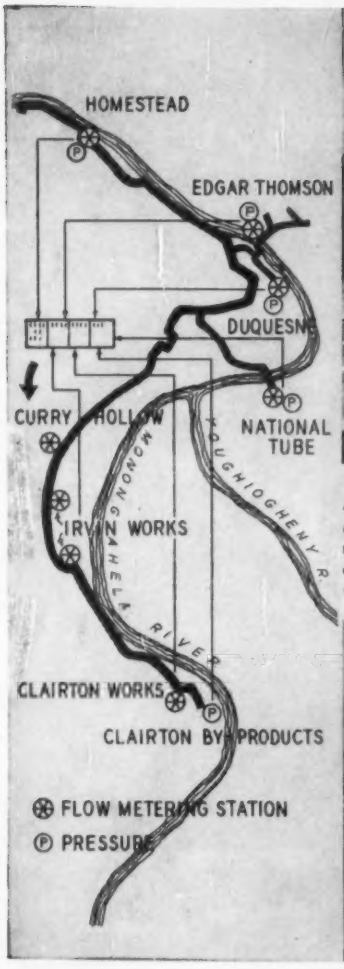
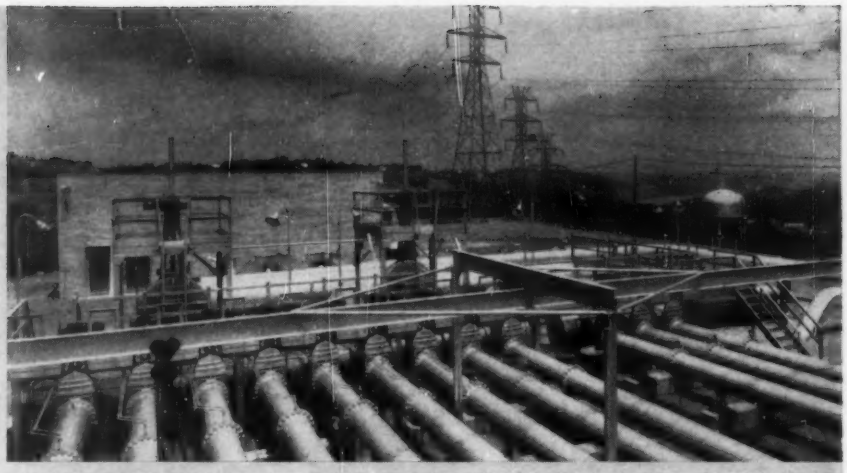
SERVING THE GAS INDUSTRY HAS ALWAYS BEEN OUR BUSINESS

4

5

6





▲ **NINE METER RUNS** for coke-oven gas (left) and three for natural gas (right) at Carnegie's Curry Hollow Station give telemetering system part of its information. Coke-oven gas arrives at Curry Hollow in 55" mains, said to be largest in world.

BRISTOL METAMETER* telemetering instruments (panels at right and rear), in Curry Hollow Station of Carnegie Natural Gas Company, give dispatcher the continuous, up-to-the-second information he needs to control gas flow to six U.S. Steel plants along the Monongahela River. (See map.) ▼

GAS FOR THE MILLS OF U.S. STEEL

...telemetered by Bristol

Supplying the U. S. Steel plants along the Monongahela River with sufficient fuel to carry on operations is the primary mission of Carnegie Natural Gas Company, Pittsburgh, Pa., a subsidiary of the United States Steel Corporation.

Bristol Metameter* Telemetering gives the gas dispatcher, at the Curry Hollow Station, all the information he needs for efficient, economical pipeline operation.

At Curry Hollow (see map), Carnegie mixes natural gas from company-owned fields to supplement artificial gas produced at the Clairton By-Product Coke Works. Some of the coke-oven gas is used at the Clairton and Irvin Steel works. The mixed gas is supplied to the remaining plants.

The Bristol telemetering system measures individual gas flows and pressures in every main. Individual flows are totalized at Homestead, Irvin, Duquesne, and Edgar Thomson Works and transmitted to the dispatcher's office in Curry Hollow. At Curry Hollow, the Irvin and Clairton Steel Works flows are again totalized with the flow in the 55-inch mains from Clairton to secure the total coke-oven gas output.

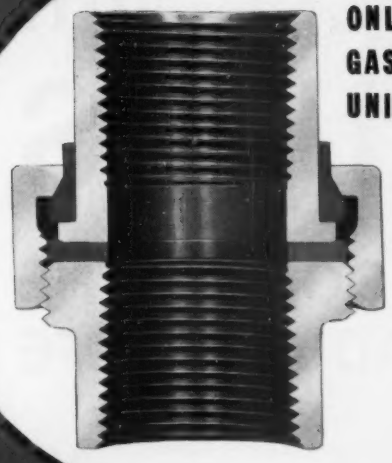
Why not find out how Bristol telemetering can improve *your* plant or operations? Bristol Metameter systems are in service by the thousands, today, on natural gas pipelines, oil pipelines, gas distribution systems, electrical transmission networks, steel plants, water distribution systems and in industrial plants. Highly-trained Bristol engineers, drawing upon Bristol's more than 45 years' experience in industrial telemetering, are available to work with you in planning, design, and installation.

For details, write for bulletin M1710. The Bristol Company, 119 Bristol Road, Waterbury 20, Conn. **T.M. Reg. U.S. Pat. Off.*

0.17

BRISTOL... for improved production through measurement and control

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



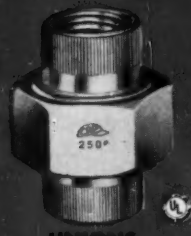
ONLY CAP GAS SERVICE INSULATING UNIONS HAVE ALL THESE FEATURES:

- Steel for strength and safety — no sand holes, no porosity
- Heavy Tapered Insulation — 3 times stronger
- Color Coded for proper temperature identification
- Phosphate coated for protection, for appearance
- Army-Navy gauging procedure assures full formed threads
- Cartoned to save time, reduce inventory loss

CAP CAPITOL fittings for gas service

assure greater safety

Steel offers maximum tensile strength and eliminates any possibility of sand holes or porosity.



UNIONS

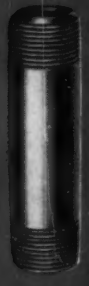
COUPLINGS

SQUARE AND HEX HEAD PLUGS

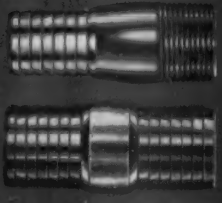
BUSHINGS

CAPS

REDUCING COUPLINGS

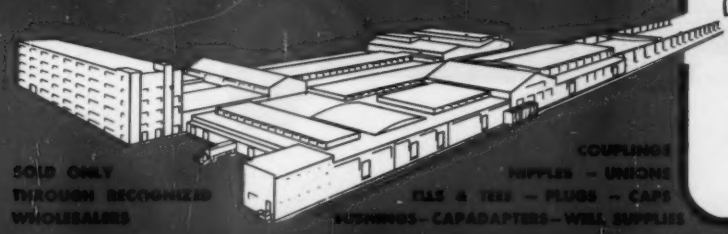


NIPPLES



CAPADAPTERS FOR PLASTIC PIPE

ELLS AND TEES



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COUPLINGS
NIPPLES — UNIONS
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BUSHINGS — CAPADAPTERS — WELL SUPPLIES

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MANUFACTURING CO.
DIVISION OF HARSCO CORP.
COLUMBUS, OHIO

Save on oil exploration and production costs with '61 FORD TRUCKS

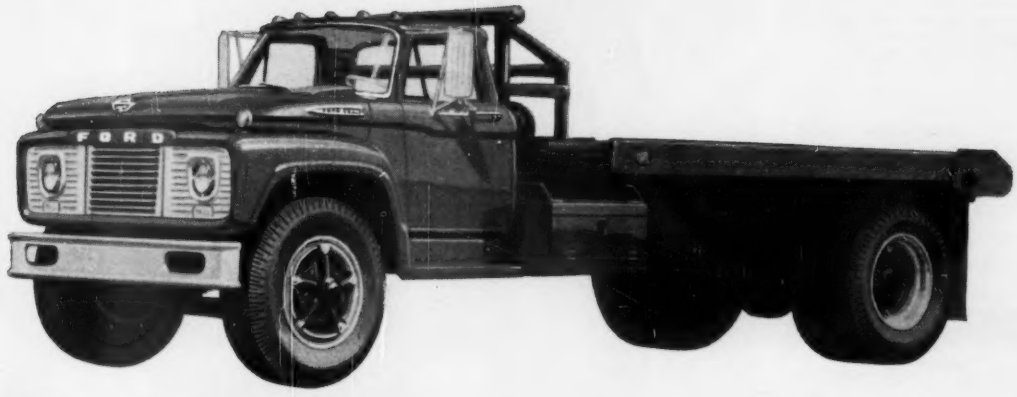
FORD HEAVIES SAVE WITH DOUBLE THE CAB, SHEET METAL AND RADIATOR LIFE

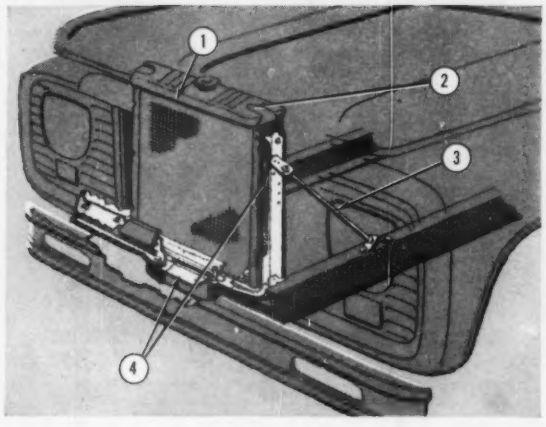
Ford F-Series Heavy Duty models are especially designed for the rugged terrain and tough conditions generally found on exploration and production jobs. Their new independent mounting system for cab and radiator effectively separates both from the adjacent sheet metal assemblies for much greater durability. And radius rod-leaf type rear springs provide better axle alignment, longer spring life.

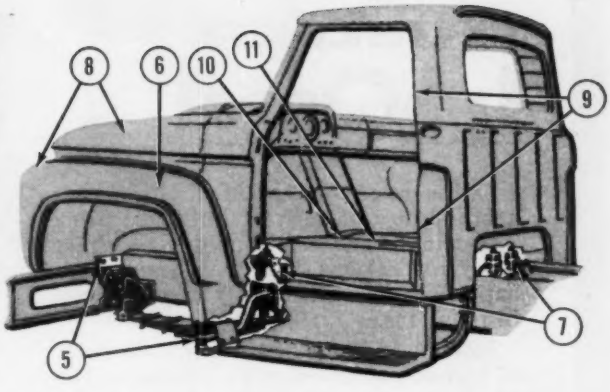
The electrical wiring system has been improved for greater reliability. Chassis wiring is fastened within the protection of the frame web, away from mud, ice and snow. Ford Truck frames have been engineered to make the mounting of bodies and special equipment easier. And a new 212-inch wheelbase model is available to accommodate extra-long bodies.

Save with Ford Heavy Duty Tandems for exceptional durability, payloads and low operating expenses. Ford T-700, T-750 and T-800 Tandems with HD V-8 engines have rugged double-channel frames that are built to take tortuous off-road treatment. And they provide a wider range of chassis options so you can choose the right power train and load-carrying components for any job. Eaton and Timken rear axles are now available in bogie assemblies with 22,000-, 28,000-, 30,000- and 34,000-lb. capacities. And lightweight aluminum walking beams, wheels and gas tanks are available to keep chassis weights low . . . payloads high.

Ask your Ford Dealer about Ford's full tandem line . . . including Super Duties with 38,000-lb. bogies for up to 51,000-lb. GVW!







(1) **Save with Ford's exclusive "lock-seam" radiator construction** that doubles the solder area at key seams for greatly increased strength and longer radiator life.

(2) **Save with heavier-gauge metal on radiator tank and header.** Upper and lower tanks and header have thicker walls to resist vibration, jolts and corrosion for greater reliability.

(3) **Save with independent radiator mountings,** separate from front-end sheet metal. This means that road shocks, vibrations and shakes are not transmitted to the radiator through sheet metal . . . tanks, tubes and connections last longer, require less maintenance.

(4) **Save with "horse collar" mounting** seated on rubber pad for extended radiator life. This new mounting on resilient rubber at the center of frame cross member soaks up any frame flexing . . . cuts wear and tear on entire cooling system.

(5) **Save with independent fender mountings.** Fenders are bolted to a rubber-cushioned transverse bracket at the front and a frame-mounted bracket at the rear. This mounting, independent of both cab and radiator, eliminates stress transfers for greatly increased fender life.

(6) **Save with removable fenders.** The quick and easy removal of only 8 bolts per fender provides faster service accessibility to the engine area, saving valuable maintenance time.

(7) **Save with new 3-point cab mounting system** for greater cab durability. Two outboard front mounts plus a centered "twin" rear mount provide a triangular system that holds the cab stationary while allowing the frame to move independently . . . reducing strain on the cab.

(8) **Save with 42% heavier-gauge sheet metal** in fenders, hood, cab floor pan and toeboard for greater strength, greater durability.

(9) **Save with stronger cab construction.** New full-length door pillar reinforcements provide increased cab rigidity, stamina.

(10) **Save with a more solid foundation.** 42% thicker sheet metal is used in the integral floor pan and toeboard, this with added floor reinforcements gives a stronger base for longer cab life.

(11) **Save with new transmission access panel** to cut transmission service time.

FORD TRUCKS COST LESS

YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE...

FORD DIVISION, Ford Motor Company

SIZE 2"
Class 125 flanges comply with ASA B16.1-1960 specifications.

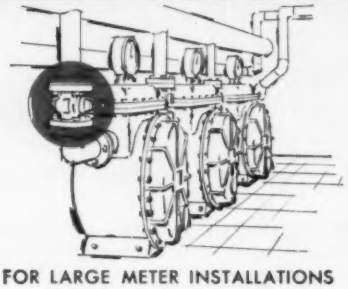
another ***NEW***

MUELLER®

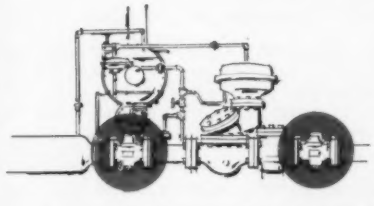
LubOseal® *stop . . .* H-11172 *with flanged ends*

To fill more of your specific needs, here is a brand-new pattern of LubOseal Stop. This flanged end stop should find a great many applications throughout your distribution system—particularly in commercial installations.

Introduced in 1952 to meet the demands of higher gas distribution pressures, the Mueller LubOseal Meter Stop gained immediate and widespread acceptance. From two basic patterns has come a full line of reliable stops. Recessed end LubOseals were added in 1958. The need for extremely high pressure meter stops led to production of 500 Pound-Ductile Iron LubOseal Stops in 1959. Customer requests for a dependable meter stop with an insulating outlet resulted in the introduction of the Insulating Union LubOseal in 1960.



FOR LARGE METER INSTALLATIONS



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5587

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Factories at: Decatur, Chattanooga, Los Angeles
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While torque-converter drive is of *primary benefit in front-end loader operation*, it also gives you the extra power and traction you need for getting your backhoe in and out of muddy conditions like this.

Other important benefits you get as standard equipment with the CASE W-3

- Choice of Case-built 52 hp gasoline or Diesel engine
- *Bigger drive tires* — 14.9 x 24 6-ply
- 10-ply front tires
- 7000-lb capacity front axle
- *Full power steering*
- *Shuttle transmission*
- Backhoe digs 14 ft deep. Swings 180° with exclusive foot control
- 2500-lb lift capacity front end loader with 6000-lb breakout force. 15 cu ft to 1 cu yd bucket
- Self-leveling bucket
- *Wide choice of interchangeable attachments* including: dozer, grade-blade, pallet-fork, crane-hook, choice of four loader buckets and eight backhoe buckets

Why your next backhoe-loader should have both torque converter and direct drive

Many users of wheel-type backhoe-loaders make the mistake of buying the *lowest priced* rig available — only to discover that it *doesn't* have enough power or traction to handle many of the jobs expected of it. For this reason, you will be money ahead by choosing a higher-output machine, like the Case W-3, that combines the power-boosting benefits of a torque converter, with the speed and economy of direct drive. Here's why!

Travels and works where others can't

Since a torque-converter-equipped tractor provides an *infinite* number of speed ratios — down to 0 mph without stalling — you get *a lot more traction, with minimum wheel slippage.* Result: With the Case W-3, you can load faster, backfill, climb slippery grades, travel and work through hub-deep mud that would stall ordinary wheel rigs.

Double push-pull power—without clutching or shifting

The diesel or gas-powered Case W-3, with torque converter, gives you *twice* as much push-pull power as the same size conventional rig. In addition, torque output is matched to the load instantly—AUTOMATICALLY—*without clutching, shifting, or stalling.* This enables you to load-out bigger payloads much faster with the front-end loader . . . a tremendous time-saver in backfilling, and clean-up operations . . . an extra money-maker in truck-loading.

Full hydraulic priority . . . longer life

The converter keeps engine and hydraulic pump running at full effective rpm, without "lugging down". You *always* have full hydraulic power for fast break-out with the loader bucket. The torque converter also gives you longer tractor life since all components are protected against operating shocks by a "cushion" of hydraulic oil.

Drives job-to-job at 19.3 mph

With the Case W-3 loader, or combination backhoe-loader, you get all these proven benefits of torque-converter drive — *plus* a handy lock-out lever that lets you *switch to direct drive "on-the-go"* — for 19.3 mph road travel.

Nets you more profit per dollar of investment

While the Case W-3 costs a few dollars a month more than so-called "economy" diggers, its extra productivity and go-anywhere ability, enable you to handle a *wider range of backhoe-loader jobs at higher net profit.* See your Case Industrial Dealer for convincing proof, or write J. I. Case Co., Dept. A1391, Racine, Wis.

CASE®

J. I. CASE CO., RACINE, WIS.

C-BL-535

ONLY THE CASE W-3 GIVES YOU BOTH . . . SEE AND COMPARE IT TODAY!

Dow division uses X-TRU-COAT for a 30-mile run through swampy Louisiana soils

Dow Chemical Company's Louisiana Division selected 4½″ O.D. X-TRU-COAT (Republic's *plastic-coated* line pipe) for a service installation involving long runs through swampy soils near Plaquemine, Louisiana.

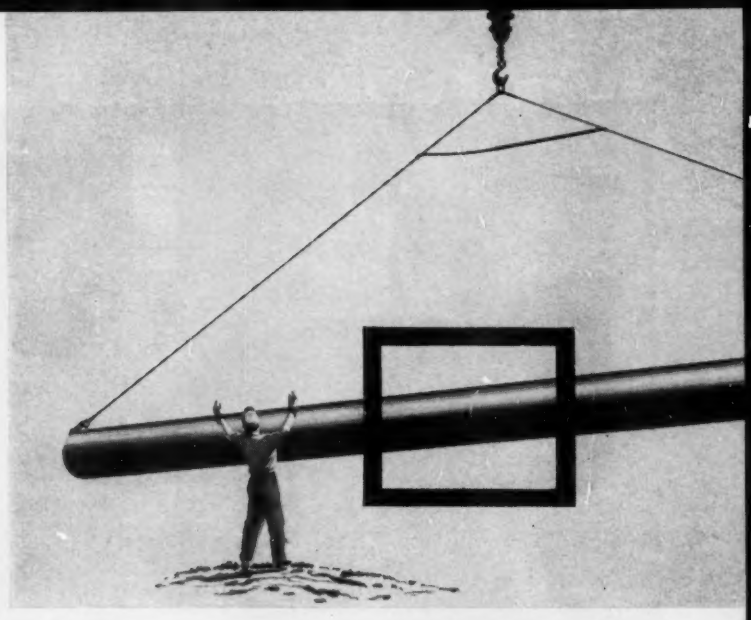
A 30-mile pipe line was needed to transfer products between Dow's Plaquemine facility and storage points. Dow specified X-TRU-COAT on the basis of corrosion-resistance, ease of installation, and overall cost comparisons.

The high density polyethylene coating of Republic X-TRU-COAT is continuously extruded over "live" undercoating to seal out electrolytic action. X-TRU-COAT is immune to ground chemicals and resists shipping, stringing, and backfilling damage.

X-TRU-COAT Plastic-Coated Line Pipe (Republic coats it at the pipe mill) is available in 1.050″ through 8.625″ O.D. You can also have the coating on Republic Light Wall—in 1″ through 4″ nominal—for gathering and distribution systems.

The complete package includes Republic X-TRU-COAT, X-TRU-TAPE Joint Wrap, and X-TRU-PRIMER. For information or quotations, call your nearest Republic representative or mail the coupon. X-TRU-COAT is produced under the Dekoron® Process.

Strong,
Modern,
Dependable

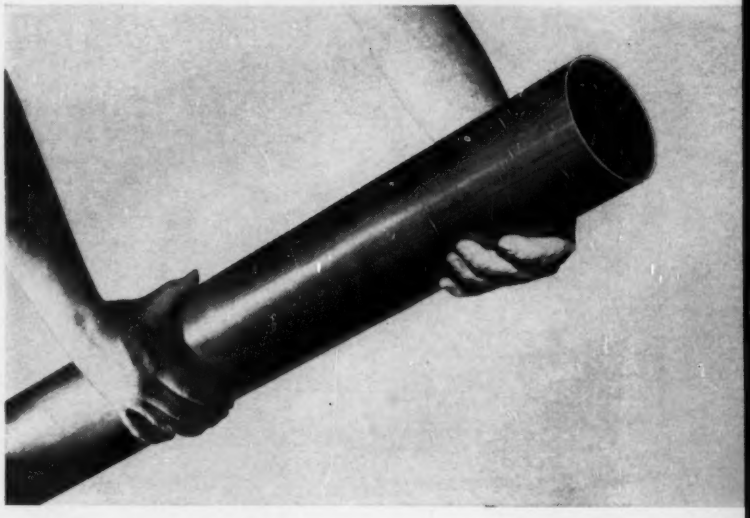


REPUBLIC SUPER-SPAN

Specify fusion weld in these 60-foot lengths and make 33⅓% fewer field welds. SUPER-SPAN is produced by joining two 30-foot lengths under ideal submerged arc welding conditions. Hydraulically expanded and hydraulically tested, this pipe is straight and strong . . . offers uniform wall thickness, constant circumference, and accurate size. Available in 24″ through 30″ O.D.

REPUBLIC LIGHT WALL

You save up to ⅓ the weight, ⅓ the cost. Of special interest for low pressure gathering and distribution applications, Republic Light Wall is manufactured to applicable parts of API specification 5L, in sizes from 1.315″ through 4.500″ O.D. For maximum corrosion-resistance, you can have Republic's X-TRU-COAT plastic coating in all light wall sizes.



REPUBLIC SRK® PLASTIC PIPE

Unaffected by crude oil, brine, or gas, SRK saves time and money in many oil field jobs. It costs no more to buy than ordinary pipe. Available in sizes from ½″ through 8″, SRK is a semi-rigid plastic pipe that cuts with a handsaw. It is joined with plastic fittings and can be installed in combination with existing metal lines. Mail coupon below.

REPUBLIC STEEL

CLEVELAND 1, OHIO

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. G5-1602
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

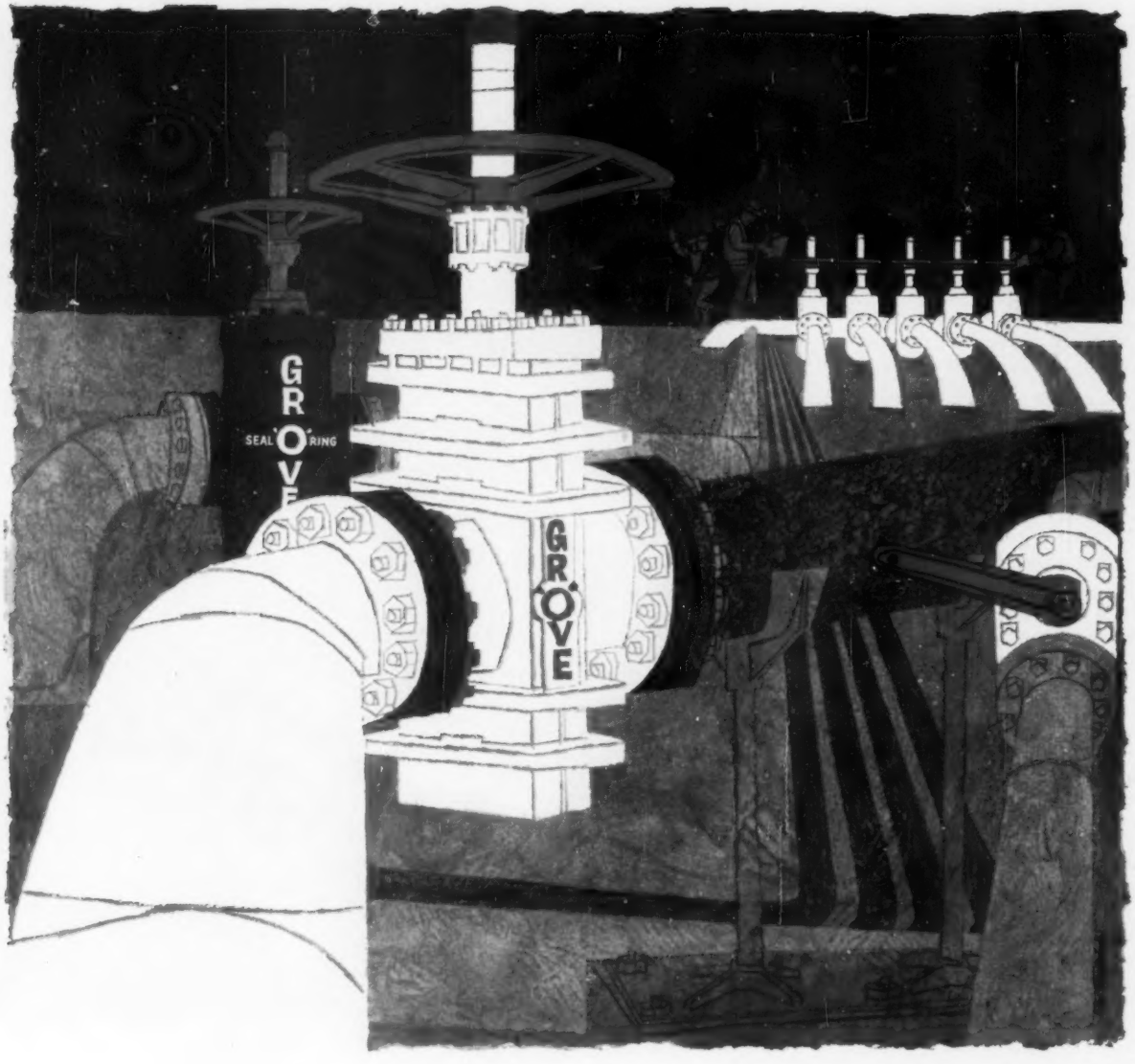
Please send more information on:
☐ Republic X-TRU-COAT ☐ SUPER-SPAN
☐ Light Wall ☐ SRK Plastic Pipe

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____



PIPELINE VALVES? GET GROVE

Whatever the service, there's a proven Seal-"O"-Ring® Grove valve ready for duty. G-3, G-4, and new G-5 series Grove gate valves are available in sizes and working pressures to suit your needs. And Grove valves never need lubrication! For complete details on any Grove pipeline valve, write for Catalog 541.

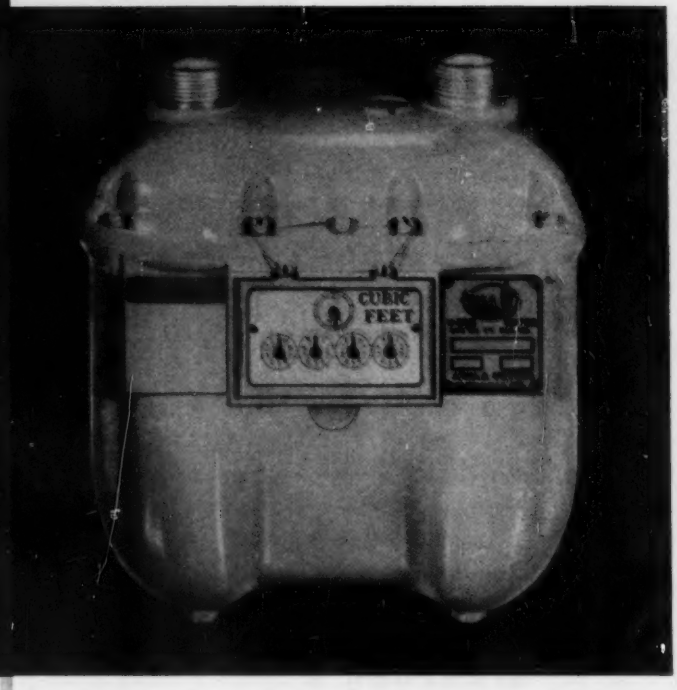
GROVE PIPELINE VALVES

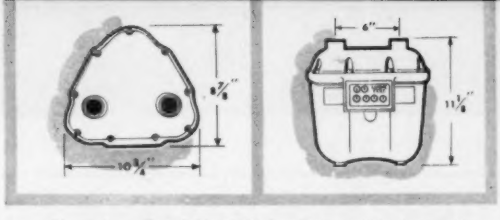
GROVE VALVE AND REGULATOR COMPANY
A Subsidiary of Walworth
6529 HOLLIS STREET • OAKLAND 8, CALIFORNIA
Offices in principal cities throughout the United States

THE ARKLA

V 250

GAS METER





Dimensions: The Arkla V250 Gas Meter weighs less and is smaller than any other 250 cu. ft./hr. gas meter.

A NEW, COMPACT, ACCURATE "CASH REGISTER" FOR THE GAS INDUSTRY!

EXCELLENT ENGINEERING AND DESIGN of this gas meter, first of a new, modern line, are evident in its light weight and compactness that make the Arkla V250 Gas Meter easy to install... fewer moving parts reduce maintenance... accuracy of the Arkla V250 Gas Meter makes it a welcome "cash register" for the gas industry.

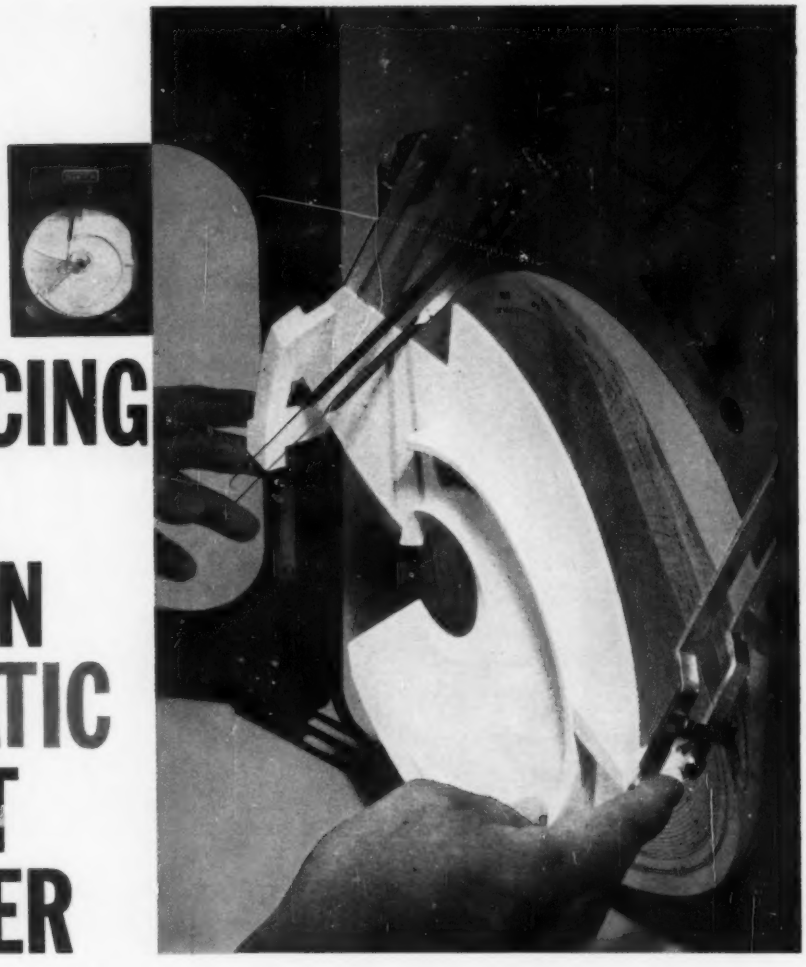
Order ARKLA V250 GAS METERS TODAY. *(Other models available soon.) For further information, write or call us, or ask your Arkla-Reynolds Gas Regulator representative.*

ARKLA

WRITE OR CALL:

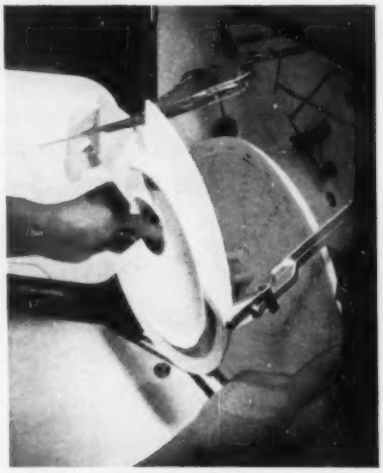
A Division of Arkla Air Conditioning Corporation

ANNOUNCING THE BARTON AUTOMATIC CHART CHANGER



LOADING IS SIMPLE...

1. The Barton chart changer will hold up to 16 patented, split charts. A locating pin on the chart plate makes it virtually impossible to load incorrectly.



2. With the scroll assembly and the pens mechanically lifted and locked out of the way, the loaded chart plate is quickly mounted onto the chart drive shaft.

3. The scroll assembly and pens are lowered and locked into place. There is nothing to adjust, nothing to go wrong. Capillary pens are supplied by ink bottle inside the case.

HANDLES UP TO 16 CHARTS; AUTOMATICALLY CHANGES TO A NEW CHART ON EACH REVOLUTION OF THE CHART DRIVE

Now your recorders can operate for up to 16 days, *untended*, and still produce a separate 24 hour chart for each day. The amazing new Barton chart changer eliminates the need for manual chart changing; it does the job *automatically* and *by itself!* Simple and foolproof both in handling and operation, the Barton chart changer *simplifies your accounting* by providing exact, consistent accounting periods, *cuts down your labor costs* by drastically reducing the frequency of your chart routes, *increases the readability of your records* by making it possible to select the optimum chart rotation for each application. Available in complete, ready-to-install kit form (it fits the Barton 202 and 202A recorders, the Bristol series 500 case, and the American Types D and A cases) the Barton chart changer will not jam, miss charts, or allow the recorded charts to be damaged. It is completely dependable, as reliable as the recorder. For complete information, see your Barton man or send in the coupon today.

Gentlemen: Please send me your free bulletin on the new Barton Chart Changer.

NAME

COMPANY

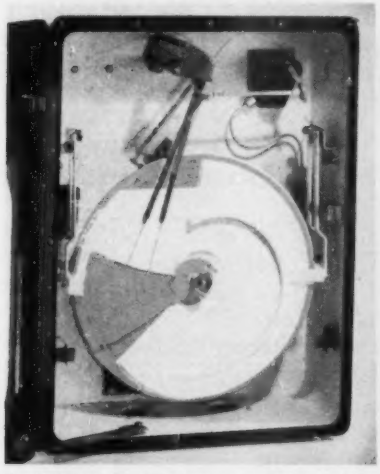
ADDRESS

CITY ZONE STATE

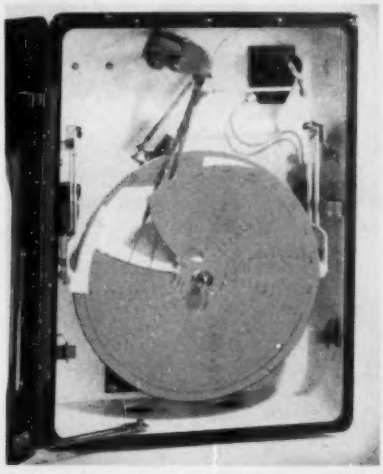
BARTON® INSTRUMENT CORPORATION

580 MONTEREY PASS ROAD • MONTEREY PARK, CALIFORNIA

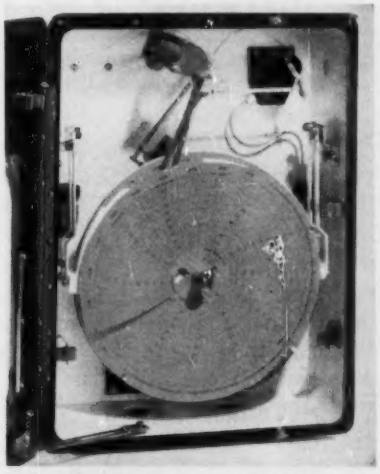
OPERATION IS SURE!



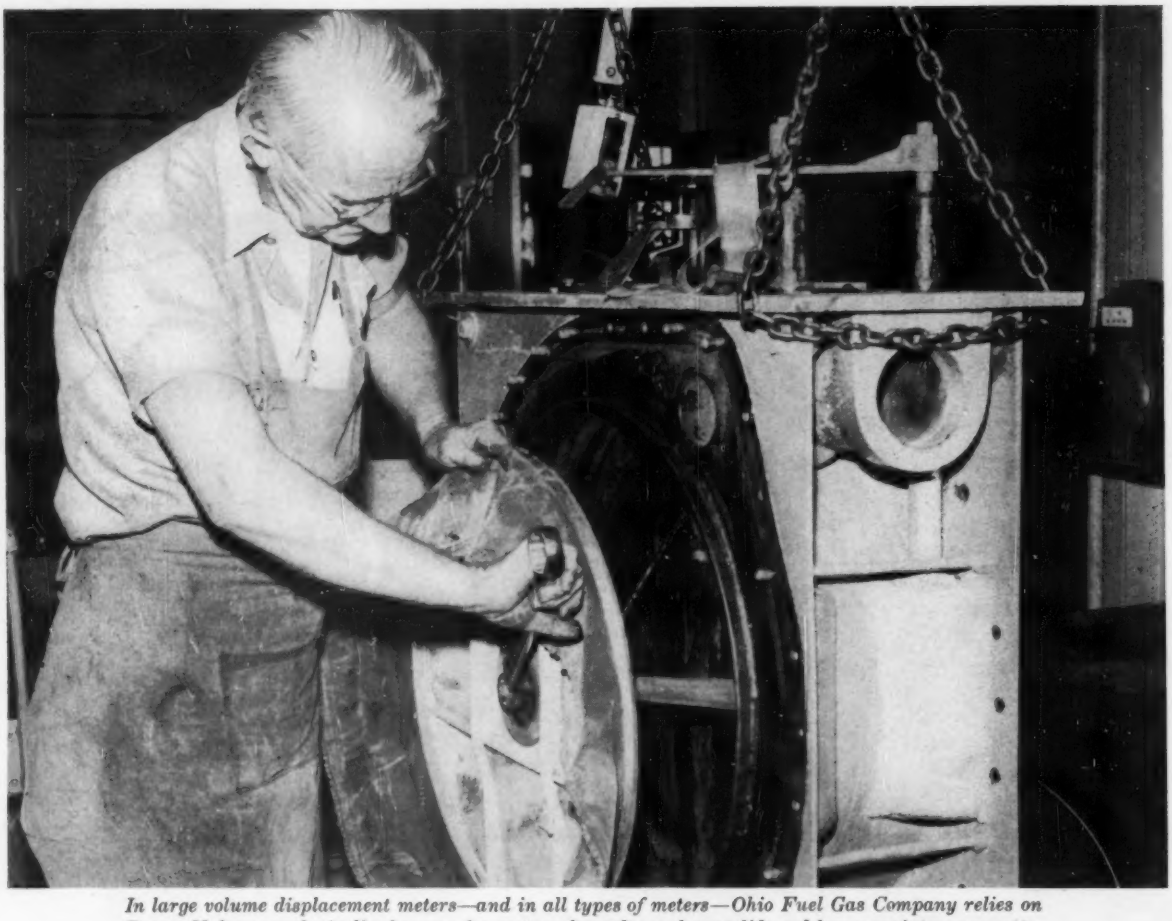
1. With the chart changer in position, the recorder is ready to operate. A portion of the chart (in green for illustration) shows from behind the scroll. Note the tab on the chart has just been picked up by the scroll knife edge.



2. As the chart drive rotates, the portion of the chart that has been recorded is spun onto the shaft and well away from the pens which are now recording on the last part of the chart.



3. The first chart has now completed its cycle and is held for storage on the shaft, clear of the pens, which are now recording on the newly exposed second chart. The pens begin recording on the new chart at the precise moment the first chart completes its rotation.



In large volume displacement meters—and in all types of meters—Ohio Fuel Gas Company relies on Reeves-Vulcan synthetic diaphragms for greater dependence, longer life and lower maintenance costs.

"We greatly reduced P.D. meter maintenance with Reeves-Vulcan synthetic diaphragms"

M. P. DeBaets, General Superintendent Gas-Measurement Department, Ohio Fuel Gas Company, Columbus, Ohio

"The frequent replacement of leather diaphragms required in large-volume, positive-displacement meters on gas wells," says Mr. DeBaets of Ohio Fuel Gas, "was, at one time, one of our major maintenance problems."

Problem: "When we were using leather diaphragms, the impurities in the wellhead gas would wash the oil out of the diaphragms, and diaphragms had to be replaced frequently. And cold weather aggravated the situation."

Solution: "About 6 years ago, we changed to Reeves-Vulcan synthetic diaphragms for these meters, as well as for industrial and domestic meters. Our experience shows that Reeves-Vulcan synthetic diaphragms last longer... withstand wellhead gas impurities...operate better at low temperatures... are not affected by odorants. What's more, since they require no oil, maintenance schedules have been extended."

Since changing to Reeves-Vulcan synthetic diaphragms, Ohio Fuel Gas reports substantial savings through reduction in meter maintenance and testings, and a much lower rate of diaphragm replacement. How about *your* metering efficiency?

There's a Reeves-Vulcan diaphragm for practically every type of gas meter made. Both molded and crimped styles are available in any volume. Order Reeves-Vulcan synthetic diaphragms from leading manufacturers or directly from:

REEVES VULCAN

Reeves Brothers, Inc., Vulcan Rubber Products Division
1071 Avenue of the Americas · New York 18, New York

Save on exploration operations with new 1961 FORD 4x4'S

SAVE WITH AMERICA'S LOWEST-PRICED* 4-WHEEL DRIVE PICKUP WITH BIG 8-FOOT BOX

Pipeline contractors and utility companies everywhere are finding that Ford's good-looking 4 x 4's are real money-savers for off-road operations. The F-100 Flareside model is America's lowest-priced pickup with 8-foot box! And both the F-100 and F-250 (½- and ¾-ton models) are designed to keep right on saving with *lower* operating and maintenance expenses.

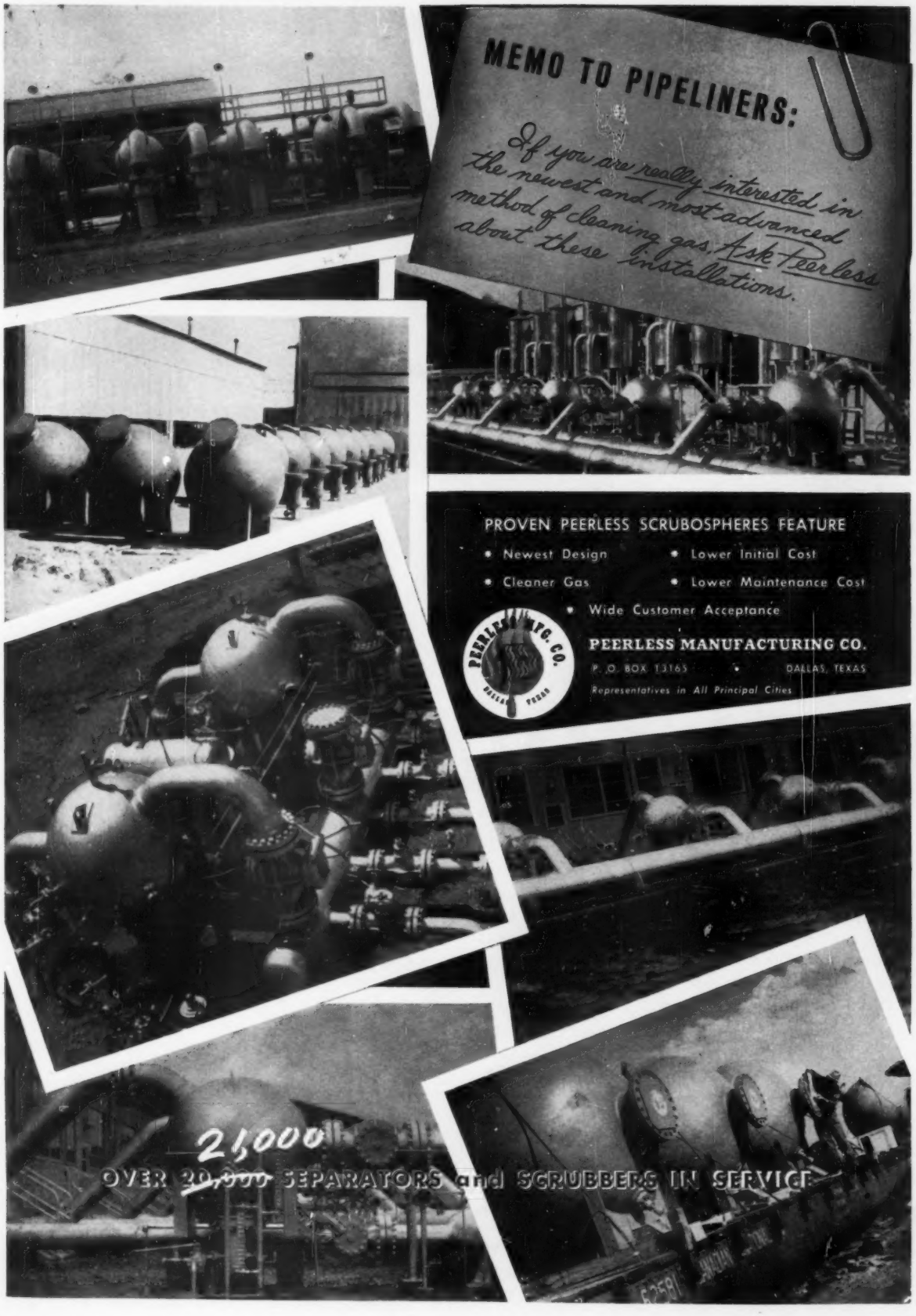
You can choose the gas-saving 135-hp Six, or the 160-hp V-8 that gives extra power and smoothness with "six-like" economy! And . . . on all 1961 Ford Trucks, each part, except tires and tubes, is now warranted by your dealer against defects in material and workmanship for 12 months or 12,000 miles, whichever occurs first. The warranty does not apply, of course, to normal maintenance service and to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points. Never before have you had such protection . . . such evidence of long-term economy!

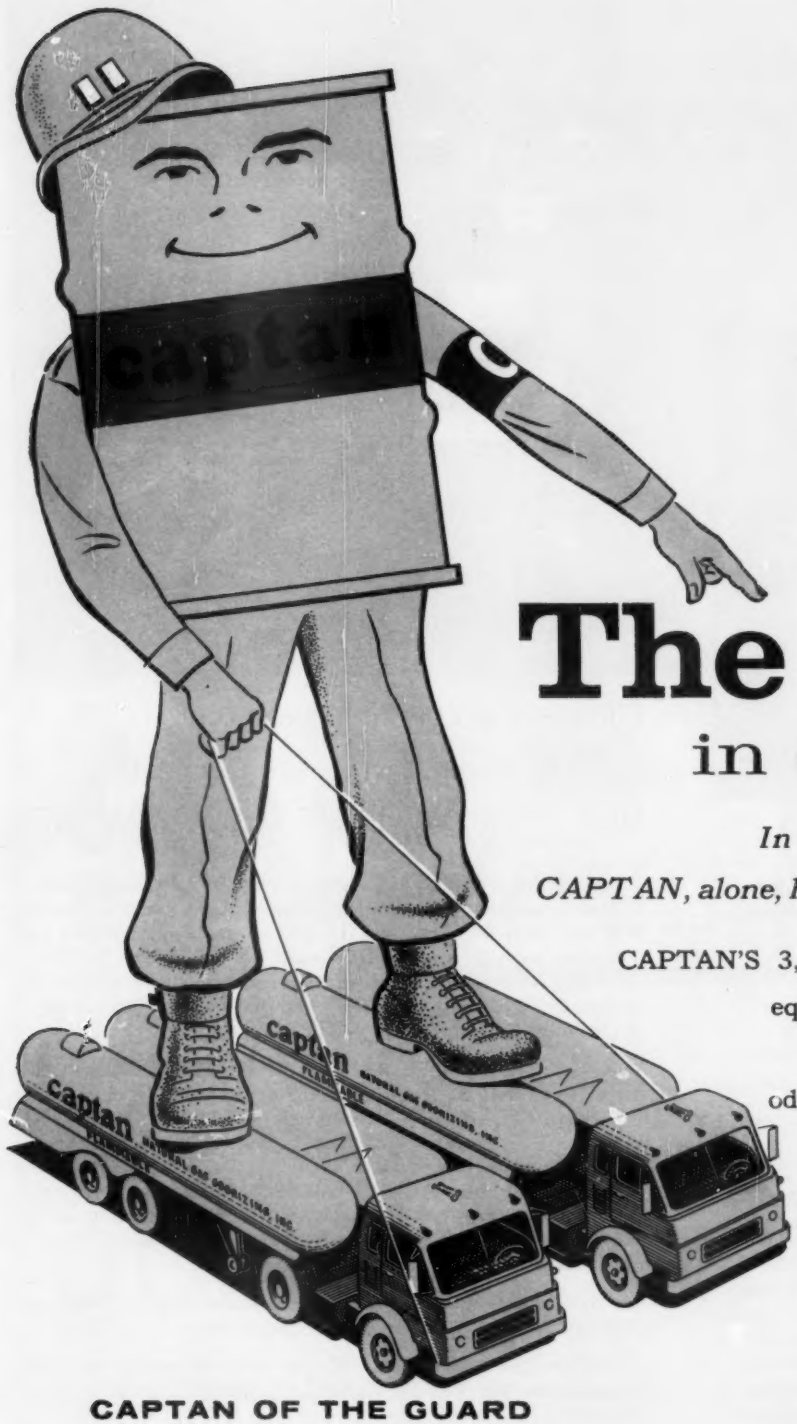
**Based on a comparison of latest available manufacturers' suggested retail delivered prices*

FORD TRUCKS COST LESS

YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE...

FORD DIVISION, Ford Motor Company


MEMO TO PIPELINERS:
If you are really interested in the newest and most advanced method of cleaning gas, Ask Peerless about these installations.
PROVEN PEERLESS SCRUBOSPHERES FEATURE
• Newest Design
• Lower Initial Cost
• Cleaner Gas
• Lower Maintenance Cost
• Wide Customer Acceptance
PEERLESS MANUFACTURING CO.
P. O. BOX 13165 • DALLAS, TEXAS
Representatives in All Principal Cities
21,000
OVER 20,000 SEPARATORS and SCRUBBERS IN SERVICE



CAPTAN OF THE GUARD

The Most
in delivery...

In the Gas Odorization field,
CAPTAN, alone, has its own Delivery Fleet.

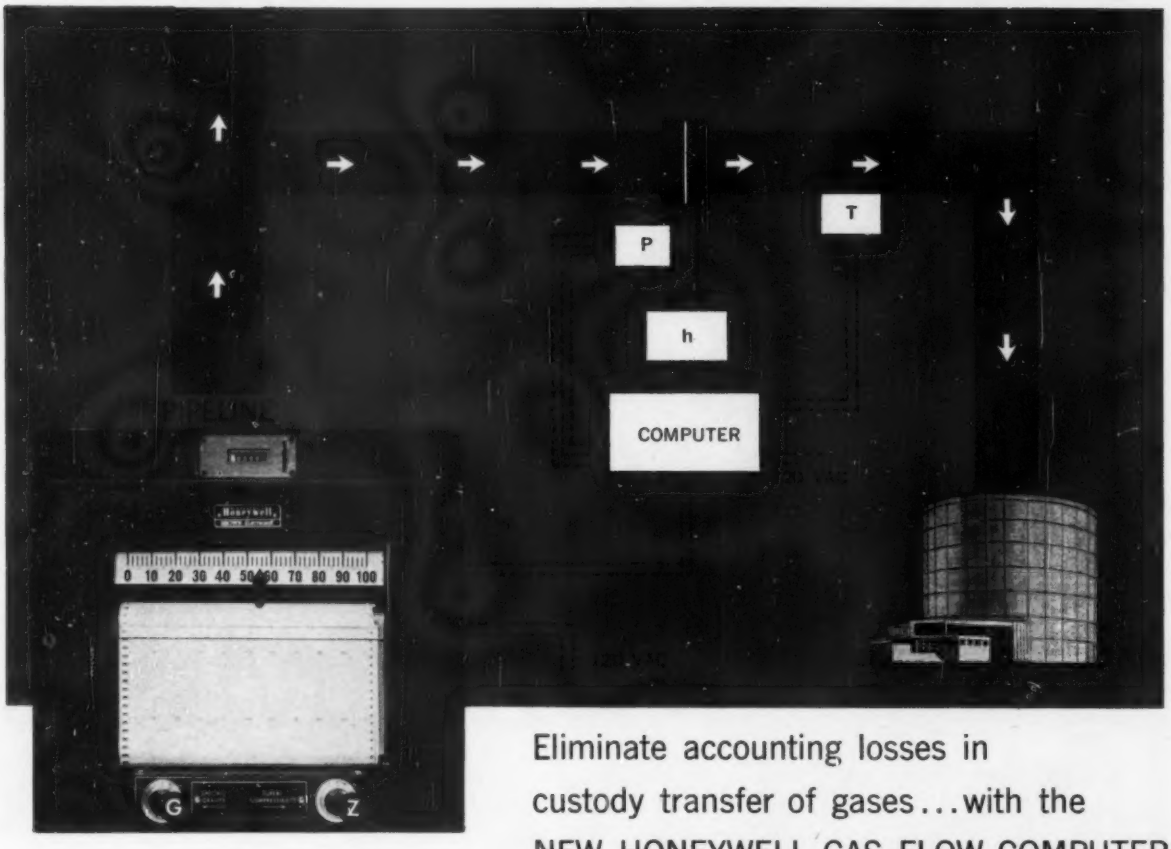
CAPTAN'S 3,400 gallon tank wagons are equipped with lines and fittings designed especially for odorant handling and are used exclusively for odorant delivery. They are driven by CAPTAN'S own experienced odorant specialists.

☆ *Don't delay . . . phone, wire or write us today!*

NATURAL GAS ODORIZING, INC.

P. O. BOX 15252 / HOUSTON 20, TEXAS

60-5



Eliminate accounting losses in custody transfer of gases...with the NEW HONEYWELL GAS FLOW COMPUTER

When you're selling or buying gas, even a slight inaccuracy in flow measurement can mean the loss of many dollars. Prevent this loss with the accurate, all-electric gas flow computer. It measures, records, and totalizes *mass rate* of gas flow, automatically and continuously. Temperature and pressure variations are compensated for automatically—eliminating the inaccuracies of "averaging" and other methods of computation.

The gas flow computer does away with tedious, time-consuming calculations and the possibility of human error. In most applications, it will perform with accuracy of $\pm 1\%$, and, under ideal conditions, with accuracy of $\pm \frac{1}{2}\%$. You can use this new computer to measure mass flow of natural gas, propane, butane and other hydrocarbons. And you can easily link it to telemetering and remote control systems, supervisory control, data handling, and industrial process computers. Cost of the computer in most installations runs less than $4000.

Get complete details from your nearby Honeywell field engineer. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

Here's how the Honeywell gas flow computer solves a gas flow equation:

$$Q = K\sqrt{\frac{hP}{TGZ}}$$

Where **Q** = mass rate of flow, scfh
h = differential pressure, inches of water
P = static pressure, psia
T = flowing temperature, °R, (°F + 460)
G = specific gravity
Z = super-compressibility
K = orifice flow constant

The *ElectriK Tel-O-Set* △P/I transmitter measures *h*; an absolute pressure transducer measures *P*; and a resistance thermometer bulb measures *T*. The analog computer multiplies *h* by *P* and divides by *T* . . . and sends a resultant millivoltage to the *ElectroniK* recorder. The recorder applies the correction factors G and Z, extracts the square root, and records the resultant mass flow Q.

Honeywell

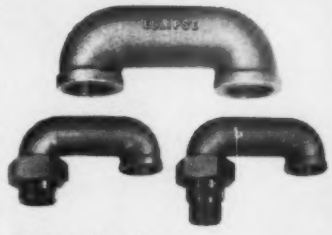
First in Control

SINCE 1885

Eclipse

GAS SERVICE PRODUCTS

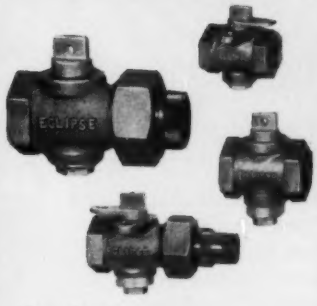
For Safer, More Attractive and Economical Meter Installations



Return Bends
Cut down number of threaded joints, save pipe fitting time, and assure parallel piping in your meter sets. Plain and Wedgeseal-Insulated, female by male and female by female. Bulletin No. 500-2.

Unions, Tees & Elbows
A wide variety of Wedgeseal-Insulated types with versatile combinations of male or female threaded ends. Accurate, time-saving, and effective insulation. Bulletin No. 400-2.

Swivels, Nuts, Accessories
"Certified" construction, accurately machined. Complete stock of straight, offset and adapter swivels and nuts. Bulletin No. 300 for swivels and nuts; No. 1900 for accessory items.



Gas Cocks
Iron body, red brass core with either standard or "Retained Key" construction. Also furnished with integral Wedgeseal-Insulated union either male or female. Bulletin No. 600-2.

Rigid Meter Bars
Union, sleeve or compression type. Union type available in Wedgeseal-Insulated, standard gasket, or brass-to-iron ground joint — with standard key or "Retained Key" integral gas cock available. Bulletin No. 200-2.

You benefit from one source of supply, one responsibility with Eclipse Gas Service Products. Dense, solid castings — free from porosity — are used throughout with accurately machined collars, pilots, and threads.

Eclipse Wedgeseal-Insulated union, meter bar, gas cock, and return bend packages offer 100% protection against stray or induced house currents . . . prevent electrolytic corrosion . . . the multipurpose units cut down on the number of threaded joints in your gas service piping and meter installations. The integral insulator cannot be left out — nor will it shear off, pull out, or crack during service. Ask for descriptive bulletins and specification sheets.

Eclipse®

GAS SERVICE PRODUCTS DIVISION
ECLIPSE FUEL ENGINEERING COMPANY
1109 Buchanan St., Rockford, Illinois

UTILITY MODEL 125 CROSS-MOUNTS BEHIND CAB. Overall length 70⅝". Complete with fuel tank. All controls in end of compressor frame for easy operation from the ground. Delivers 125 cfm @ 100 psi at fuel-saving 1750 rpm. Powered with Continental G-193 engine. Full information on request.

More efficient power for air tools

Jaeger rotary compressors for utility installation and maintenance offer two specific advantages:

- **They produce the same air volume as other rotaries at characteristically slower engine speeds, using less horsepower, less fuel, less wear on engine and compressor.**
- **Air delivery is constant under all normal demands, due to closer, instant-acting control of engine and compressor. Speed modulation is completely stepless over the entire operating range. Tools operate at full pressure and efficiency at all times.**

Efficient multi-pass oil cooling keeps air temperatures low, automatic bypass eliminates "dry starts" in cold weather. Fuel tanks hold 8-hour supply. Portable models have extra large tool boxes.

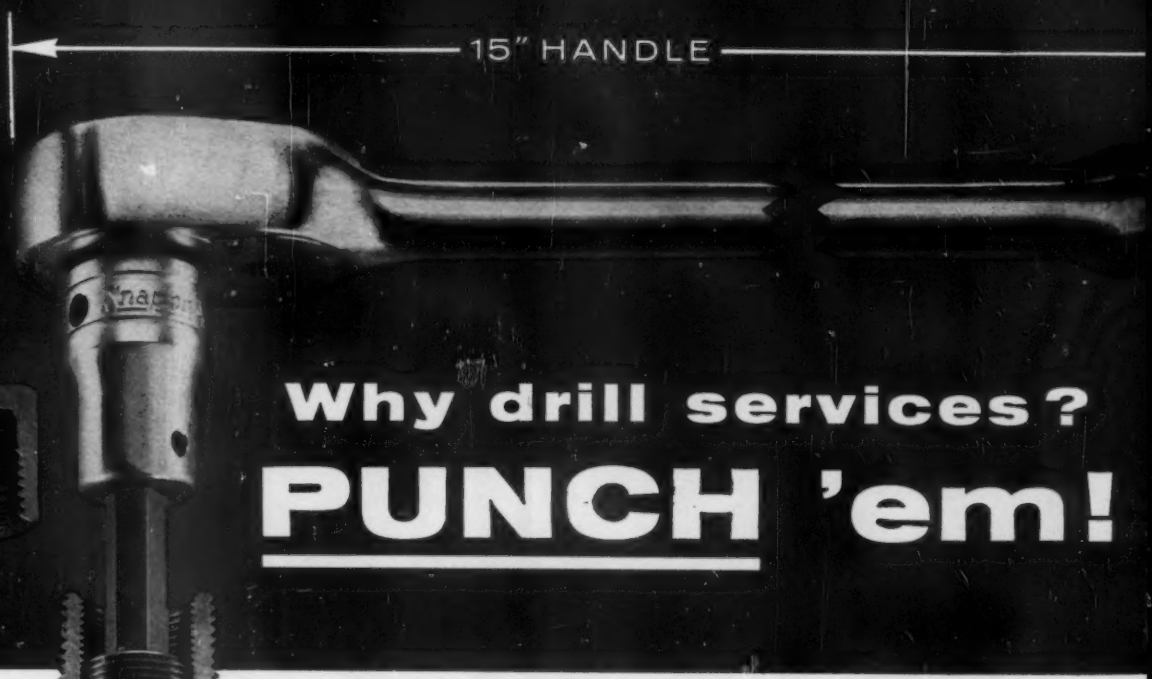
75 to 900 cfm sizes. Send for Catalog JC-0 and name of Jaeger distributor in your city. THE JAEGER MACHINE CO., 661 Dublin Ave., Columbus 16, Ohio.

JAEGER ROTO AIR-PLUS

MODEL 125 PORTABLES ON PIPELINE JOB: One of the country's most widely used compressor models. Full load speed 1750 rpm.

MODEL 365 ON LARGE TRENCH EXCAVATION in rock stratum. Full load speed 1700 rpm (100 rpm less than other makes).

MODEL 75, IDEAL FOR ONE HEAVY BREAKER: All the air you need to hold full pressure. Full load speed 1750 rpm.



Why drill services? PUNCH 'em!

This product covered by Patent No. 2,950,637 —other patents pending

Four small guides which hold punch to its true axis.

For taking services off mains. A quick, safe, steel (shell casting) welding tee that incorporates in each tee a punch and positive shut-off. Does away entirely with drill devices. We also have a model threaded at the base to screw into the saddle.

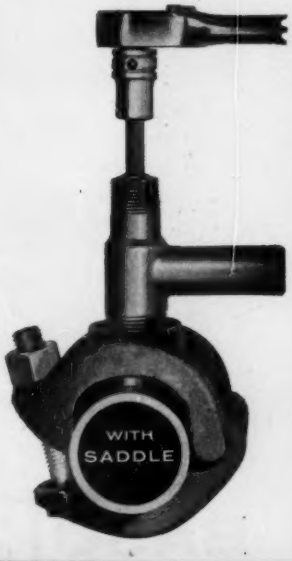
Punches. ¼", 5/16" and ⅜" diameter, recommended for 5/16" (or thinner) pipe wall thickness. ½" diameter, restricted to use on ¼" wall thickness or thinner.

Each tee is tested to 5,000 p.s.i. hydraulic pressure, and carries "Rated 1,000 pounds". A 5 to 1 safety factor. Made from steel similar to pipe, it welds easily, and in the saddle model, takes a perfect thread.

Both sizes made have 1" base. Side outlet can be furnished ¾" or 1", end beveled for welding, standard pipe size, either threaded, or smooth for compression coupling. Or outlet can be internally threaded for ½" pipe size.

With this tee you will be forever free from the cost of drilling machines, broken drills and drill machine maintenance and repairs. We feel this tee is the finest service improvement ever offered to the gas industry. Write for circular with installation instructions.

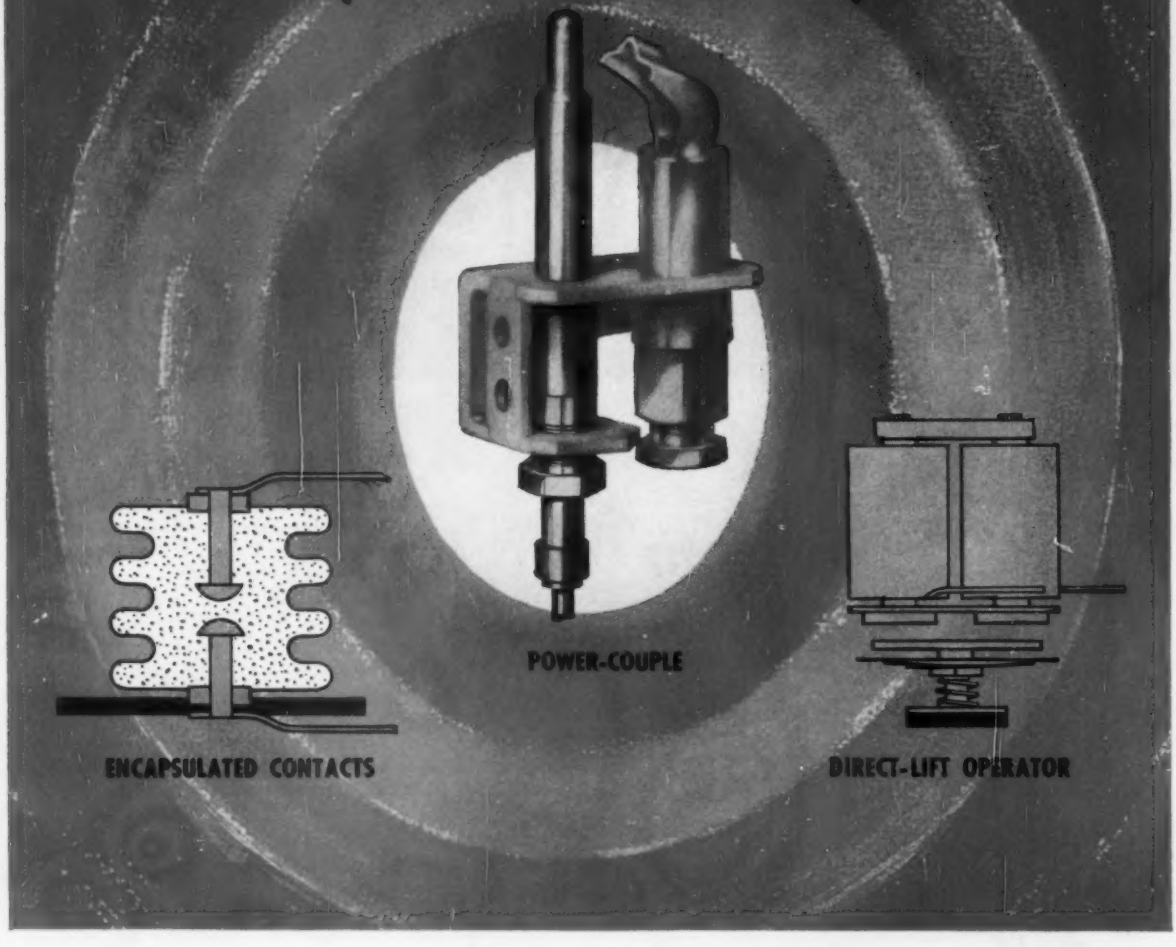
M. B. SKINNER CO.
SOUTH BEND 21, INDIANA



SKINNER-SEAL PUNCH-IT TEE

BASOTRON®

...flame-powered control systems



Three essential components that make possible a completely integrated BASOTRON flame-powered control system are SEMIMETAL POWER-COUPLE... ENCAPSULATED CONTACTS, inside bellows, assuring accurate thermostatic temperature control... DIRECT-LIFT BASOTRON VALVE.

BASOTRON flame-powered control systems are available for a wide variety of gas heating appliances.

...remember

Get the complete story at the International Heating & Air-Conditioning Exposition, Chicago, February 13-16

BOOTH 851

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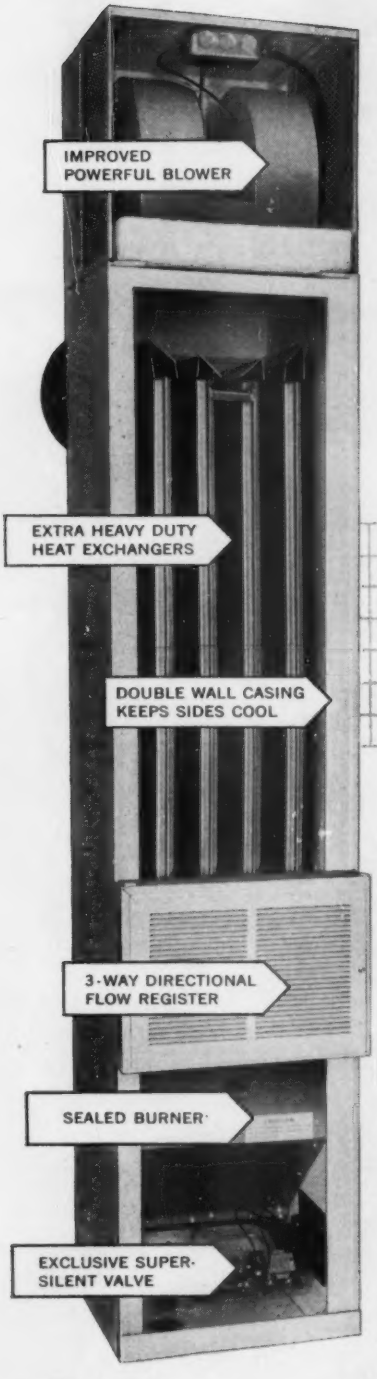

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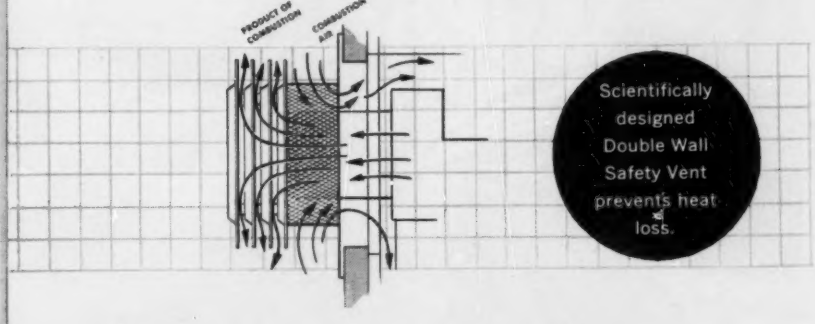

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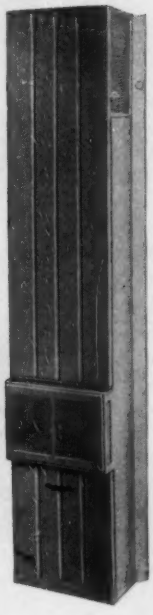

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GAS

JANUARY 1961

HOME SAFETY . . .

A challenge to the gas industry

By DAVID J. KERR, Executive Assistant • Southern Union Gas Co., Dallas

EACH of us, in his own way, is trying to advance the cause of this great industry. More particularly we are concerned about the progress of our own companies. And—quite specifically—I am sure each of us is concerned about our personal success.

As gasmen, we may look upon this subject of home safety as a sort of nebulous thing—rather hard to do anything about and certainly most difficult to translate into profits. To begin with, just about everyone believes in home safety—like Mother, God and the Pledge of Allegiance. When we turn off the expressway and into our driveway we most likely sigh a little prayer, "Home, safe home." And we think of our home as our castle, where we are safe from the troubled world (at least after we put the kids to bed and turn off the 10 p.m. news on television!).

So, we are inclined to be a bit complacent about home safety—although the National Safety Council tells us that next to the public highways our homes are the most dangerous place on earth. It may be hard to believe, but last year in the United States 26,000 persons were killed in home accidents and another 3.9 million injured—to say nothing of the cuts and bruises that probably each of us, our wives and children sustained. This compares with the 37,800 killed and 1.4 million injured in traffic accidents.

Each year tens of millions of dollars are spent on traffic safety—on engineering safer roads, on enforcement of traffic laws, on educational campaigns beseeching you and me to be safe drivers. This is good. In fact, it is essential, because the toll of dead and maimed from traffic accidents keeps rising.

But what about home safety? There is little being spent and hardly any organized effort to cut the toll here, despite the runner-up position that fatal accidents in the home hold to traffic accidents. It just so happens that last year in Dallas county, Texas, more people died in home accidents than in traffic mishaps. Yet hardly a whisper was heard about home safety contrasted to the vigorous and well-supported campaigns waged against traffic accidents.

Okay, so we got a problem. Wouldn't this be a good thing for the Kiwanians to tackle, or the Jaycees, or the Ladies Auxiliary? Surely, you wouldn't want the gas company to get mixed up in this sort of thing? We've got too many problems already. Besides, there's something about not being able to mix oil and water. You don't suggest that we try to mix gas and safety?

Yes, I do. I believe that the two are inextricably woven together. Furthermore, I believe that gas and safety are compatible. Even more importantly, I suggest that we are only kidding ourselves when we attempt to close our eyes to the close association that already exists between these subjects.

All of us in this fraternity are familiar with the story about the company president who summoned his PR man into his office and summarily informed him, "You're fired! Turn in your ulcer!"

This safety business has already given ulcers to quite a few of us in the gas industry. Ulcers over what we would do about it—or, perhaps, what we would *not* do about it. Maybe the latter is closer to the truth because actually many of us have not faced up to this problem squarely. We have skirted the issue. You might say we have ignored it in hopes that it would go away.

Well, it hasn't gone away, and the more we ignore

it, the more it's going to hurt us and our industry. It's an unhappy fact that a large segment of the population associates danger with gas, and to make a bad matter worse, only a small percentage associates danger with the product of our friendly competitor, the electrical industry.

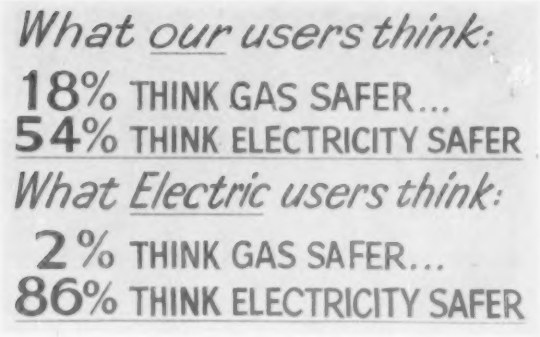
This didn't come as a sudden revelation. We have suspected it for a long time, but now we know it. The public opinion survey, conducted by Opinion Research, Inc., and submitted to the gas industry last year, revealed quite clearly just how the American people feel about the safety of gas as opposed to electricity.

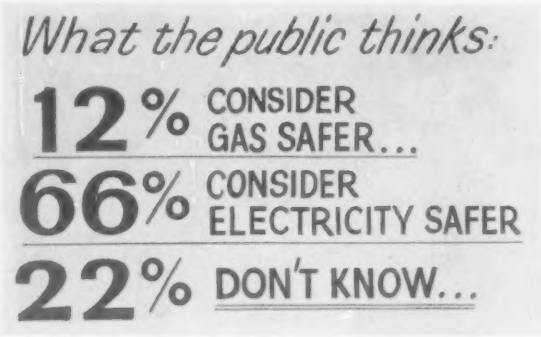
The survey figures are not reassuring. Only 12 per cent consider gas safer than electricity. Sixty-six per cent consider electricity safer. What's more, even our own customers are not sold on the safety of the fuel they're using. Only 18 per cent of the people having gas ranges believe that gas is safer than electricity. Fifty-four per cent believe electricity is safer. The other side of the coin is even more disheartening. Only 2 per cent of people having electric ranges believe gas is safer while a whopping 86 per cent gave electricity their vote of confidence.

the local newspapers sponsored by electric utilities, emphasizing "flameless" and "safety." Listen to this highly competitive copy: "There is no danger from fuel leaks . . . no pilot light to blow out . . . none of the hazards associated with flame." Adding insult to injury, an El Paso Electric Co. ad headlines "lower rates for flameless electric heating."

That such advertising is harmful to the gas industry goes without saying. But, as Robert Alden, feature writer, points out in a recent issue of the "New York Times," it can have the electrical people stewing in their own juice. He says, and I quote, "If the gas people were to follow suit, they could, without the use of an excess of imagination, counter with safety claims of their own.

"After all, a child is less likely to be burned by a flame that he can see is hot than by a heated metal that he cannot see is hot. Similarly, a housewife whose 'good sense' tells her how safe an electric water heater is for her family, could be frightened by copy that told her that water is one of the best and therefore one of the most dangerous conductors of electricity."


What our users think:
18% THINK GAS SAFER...
54% THINK ELECTRICITY SAFER
What Electric users think:
2% THINK GAS SAFER...
86% THINK ELECTRICITY SAFER



It's not the fault of our product. The gas industry, you and I, have not been giving this product the sell it deserves. But our friendly competitors have not been asleep at their electrical switches. They may have an inferior product, but we all have to admit that they sell the hell out of it.

Now, with 66 per cent of the people afraid of gas and another 22 per cent not knowing whether they are or not, the electrical folks are using safety as a competitive value in their advertising. (Probably they got their cue from a copy of the AGA-INGAA public opinion survey.)

I don't know if the recent advertisements in *Life*, *Better Homes and Gardens*, and *The Saturday Evening Post* have made you as mad as they have me, but they should. The Edison Electric Institute spent $6 million last year to convince the public that an all-electric home is a safer and better home. For example, in one advertisement they say, "Only electricity provides *flameless* water heating. Your good sense tells you how safe *flameless* electric water heating is for your family."

What's more, advertisements are now appearing in

Actually, the issue of safety is common to gas and electricity, and it takes a short-sighted person to start using safety as a competitive weapon. Naturally, we do not wish to get into a cat-and-dog fight with the electrical industry, but neither do we want gas customers deserting us to follow this Pie-Eyed Piper. The public must be educated to the fact that gas is as safe or safer than other fuels. We know it's safer, and the evidence bears us out (see charts). Incidentally, I have Ohio Fuel Gas Co. to thank for this bit of evidence which I gleaned from one of their advertisements. The National Board of Fire Underwriters shows that gas is safer than oil by a ratio of 3.7 to 1—safer than electricity by a ratio of 8.9 to 1.

The second "truth" chart presents more figures to further stiffen the backbone of our safety claims. This time from the National Fire Protection Association. Their figures for 1957—the latest available—show that gas caused less than 3 per cent of U. S. building fires, oil more than 11 per cent, and electricity more than 13 per cent. Of the total losses caused by fire, gas was responsible for only 2 per cent,

oil for more than 6 per cent, and electricity for more than 15 per cent.

So, you can see that when it comes to safety, we can make a much more valid claim than our not-so-friendly competition. But we must make the public aware of it. We cannot keep our gas flame under a bushel and expect our customers to see the light.

Some gas light is being cast on the subject, I am happy to say. Norv Jennings, director of promotion and advertising for AGA, writes me that they are fully aware of the Edison Electric Institute "Flameless" campaign and also the massive amount of "Flameless" advertising which General Electric and Westinghouse are putting out. At the general promotion and planning committee meeting last July it was agreed that AGA and its member companies should counter-attack. So far, however, I have not been exactly thrilled by our fire-power. Maybe the electronic controls have been rigged!

Naturally, we hope that the competition will see the error of their ways as advocated by Mr. Alden in his "New York Times" article. If they do not retreat—or at least agree to peaceful co-existence—this war might get so hot and heavy that Mrs. Housewife will be afraid of using either gas or electricity, as long as one presumably offers her family the choice of (1) the gas chamber or (2) electrocution. She may wind up cooking on an old wood stove like my grandmother.

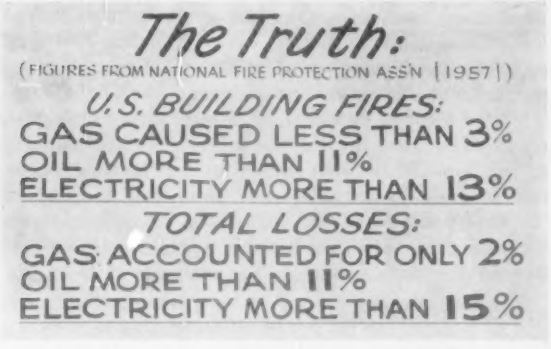
But whatever our competition does or doesn't do, we still have an educational job with the consumer to properly relate safety to gas.

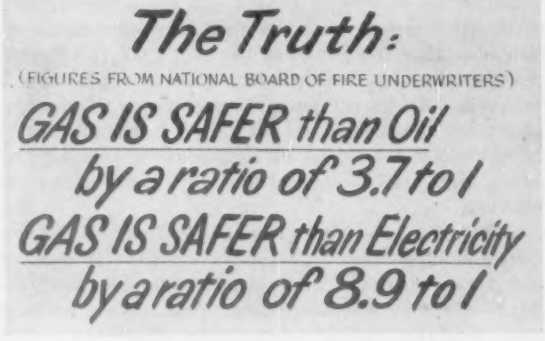
There are many ways of coming to grips with this problem. One of the best, we at Southern Union believe, is through a year-around home safety program aimed at the general public and spear-headed by an intensive safety campaign timed to the beginning of the heating season.

We have had such a program at Southern Union since 1956. It was first introduced in our New Mexico, Arizona and Colorado properties. We had become deeply concerned by the number of fatalities occurring in these high altitude areas where there is less oxygen to begin with and it is very easy to burn it up in an air-tight room. The campaign was so well received that we have repeated it every fall and last year made it system-wide. In September our fifth annual home safety campaign got underway in the 71 communities served by Southern Union in the states mentioned as well as Texas.

Happily, we are not the only voice crying in the wilderness, endeavoring to educate the public on the safe use of gas equipment. Many gas utilities are doing important work in this field, including such companies as Southern California Gas, Ohio Fuel, Northern Illinois Gas, Milwaukee Gas Light, and others. Their programs include such varied activities as the distribution of home safety booklets, advertising in all media, the showing of films to schools and civic groups, safety education for their own personnel and close cooperation with fire-fighting organizations. I conducted a survey among members of AGA's public relations committee and it is encouraging to see that quite a few of the companies they represent are meeting this issue of safety head-on.

But what is being done, in my opinion, falls far short when it comes to countering with the public's wide-spread misapprehension about gas. I believe that the reason more has not been done is, plainly and simply, fear. Our industry—at the local and national levels—has been afraid to focus attention on the safety aspects of gas. Such fear is easily understood. We had to face this problem within our own organization. Some of our managers worried that we'd frighten away users if we dared to suggest that gas might be dangerous, even though we tacked on the corollary "but not if used wisely."


The Truth:
(FIGURES FROM NATIONAL FIRE PROTECTION ASSN (1957))
U.S. BUILDING FIRES:
GAS CAUSED LESS THAN 3%
OIL MORE THAN 11%
ELECTRICITY MORE THAN 13%
TOTAL LOSSES:
GAS ACCOUNTED FOR ONLY 2%
OIL MORE THAN 11%
ELECTRICITY MORE THAN 15%


The Truth:
(FIGURES FROM NATIONAL BOARD OF FIRE UNDERWRITERS)
GAS IS SAFER than Oil
by a ratio of 3.7 to 1
GAS IS SAFER than Electricity
by a ratio of 8.9 to 1

What has been the reaction to the home safety advertisements we have run and the brochures we have distributed by the hundreds of thousands? Wholesale cancellations? Far from it. People have not been scared. There's been no flood of phone calls or panic. Experience of others in related fields could have told us we had little to worry about in this regard. For years there have been extensive campaigns on traffic safety, but Detroit continues to do a mammoth business and the streets are more clogged with cars and pedestrians than ever.

While our home safety campaigns did not cause people to throw their hats in the air, shout "Gas is safe!" and rush out and buy gas ranges, refrigerators, water heaters and dryers, they unquestionably wel-

comed our suggestions on how to make their homes safer. And although undertaken as a public service, we believe that Southern Union's home safety program has done more than its part in maintaining and building our gas load.

Newspapers, mayors, fire chiefs, police chiefs, heads of civic clubs, the ordinary citizens—all have commended our program throughout our four-state service area. This response has given all of us at Southern Union a heartwarming feeling that we have accomplished something truly worthwhile with this home safety program.

Of course when you focus attention on the dangers inherent in the product you are selling, the kid gloves are necessary. Everyone will have their own individual approach to this problem. In Dallas, where Southern Union's program is put together each year, we prefer certain ways of doing things—like one of our young ladies who attended the opera in Dallas with a girl friend from Boston. The eastern visitor was aghast when the young Texas miss removed her gloves. The Bostonian said, "In Boston, men would just as soon see a young lady remove her girdle in public as her gloves." The Texas miss replied cheerfully, "In Texas, they'd rather."

So, I admit we have our "rathers" in Texas. For example, we believe by having gas share the spotlight with other home hazards—including electricity—we are educating the public to the fact that gas dangers are just like any other home hazard which may be minimized by proper precautions. We emphasize that gas is as safe or safer than other fuels, and that it is primarily the defective appliance or venting that cause accidents—accidents that a little extra care can prevent.

Our home safety program at Southern Union has the full support of our top executives. It goes on 365 days a year, and in an election year like 1960, 366 days—since it was also Leap Year. We encourage safe working habits among our employees, assist plumbers and heating contractors to insure safe installations of gas equipment, conduct an educational program with contractors to minimize damage to our pipelines, and cooperate closely with fire departments and other public agencies to make sure gas gets a break. Our servicemen are trained to be on the lookout for unsafe conditions in the homes they visit. We have a procedure where our servicemen put a red warning tag on any appliance considered dangerous, with copies turned in to the appropriate enforcement agency in each community.

The high point of our safety program each year is a three-week campaign conducted during the fall when our customers are turning on their heating equipment.

We start the planning of these campaigns early in the spring. The talents of our safety coordinator, personnel director, tax and insurance director, vice president in charge of operations, and several persons in my department are focused on this campaign. But we know that it could not succeed without the wholehearted cooperation of our local managers. They help in its preparation by giving us ideas, suggested by the conditions in their areas. Then they go out and enlist co-sponsors whose assistance at the local level is one of the most significant factors in the campaign. Our managers hold meetings with all employees before the campaign is kicked off, then arrange to distribute safety material to the schools, to civic groups and elsewhere. They make safety talks, secure the cooperation of newspapers, radio and television stations, and local government officials. These managers of ours are the base of the tower of consumer confidence we are striving to build.

In advance of the campaign we send out a "how-to-do-it" booklet to our managers. Later we distribute a brochure containing newspaper advertisements, press releases, public service radio and television announcements, stickers, fact sheets and even a lapel button which our employees wear during the home safety campaign. We hope everyone will vote for this little fellow! A key item is a cartoon-style booklet which we distribute through schools and civic groups as well as direct to our customers in some areas.

A colorful flip chart and script is used by our people in making talks to civic clubs and other organizations. Of course, we back up this entire activity with articles in the *Southern Union News* and with memorandums and bulletins from our top officials to our company personnel.

I cannot help being enthusiastic about our home safety program. Each year, in my opinion, it has been more successful than the previous year. True, we cannot point to having saved X number of lives or prevented Y number of accidents. However, after our present campaign has been run, we should have a better idea on how people in our communities feel about our efforts to promote safety. We are planning to run a public opinion survey in our various properties to gauge what effect our campaign has had on the safety habits of our customers, as well as to determine their attitude toward Southern Union and gas service, as a result of this campaign.

We have already cashed in on a lot of public good will by conducting these fall campaigns as part of our year-around safety program. I wish I could show you the vast number of newspaper clippings, the letters from the people in the communities we serve—people in all walks of life—commending this program. I think I'm as safe as natural gas can be, when I say that our campaigns have been of real value to the communities we serve and to our company, and the public relations benefits have far outweighed the costs.

In closing, I wish to refer back to my title, "Home Safety—A Challenge to the Gas Industry." I earnestly believe there is a clear call for action by our industry in this field of safety. The attitude of the public towards the safety of gas appliances demands action. The aggressiveness of our competition makes it imperative. Certainly, too little is now being done to educate our customers on the safety of gas. I hope that all of us who are doing something will be able to do more, and that any of us who may have been resting on his oars will rear back and start stroking, and stroking hard. The very existence of our industry is at stake. We cannot continue to ignore a situation which can have *electrifying* results for our gas load. ■

This article is adapted from a talk presented at the AGA Public Relations Workshop, Sept. 30, 1960, in Chicago.

Fig. 1. Aerial view of Keyes helium production plant.

HELIUM . . .

Its increased use and importance

By PAUL V. MULLINS

HELIUM consumption has increased nearly tenfold in the past 12 years. At intervals during this period the rate of increase in demand exceeded the rate at which production facilities could be expanded, and temporary shortages existed.

Helium is best known as a lightweight, nonflammable gas used for inflating dirigibles, blimps, and balloons; however, present uses include important roles in shielded-arc welding, nuclear energy development, missile fabrication and operation, space exploration, and a number of other applications in several fields of technological investigation and development.

Helium is produced by extraction from helium-bearing natural gases. The Bureau of Mines, U. S. Department of the Interior, operates five helium production plants at Amarillo and Exell, Texas; Otis, Kan.; Shiprock, N. M.; and Keyes, Okla. The newest plant, at Keyes, began production in August 1959. An aerial view of the plant is shown in *Fig. 1.* This plant increased annual helium output by about 80 per cent. Output is now adequate to meet present demands and those predicted for the next two to three years.

The rapid and sustained increase in helium consumption prompted a critical review of the nation's helium resources. The principal known helium resources are contained in natural gas reserves that are being dissipated at a fairly rapid rate by use of the natural gas as a fuel. A broad helium conservation program involving recovery of helium from natural gas for storage underground and subsequent use as needed is being proposed to guarantee the nation an adequate supply of helium in the future.

• Helium consumers

Over 75 per cent of the helium produced is consumed by federal agencies, principally defense agencies and the Atomic Energy Commission. *Fig. 2* shows the approximate proportions of helium used by

Mr. Mullins is General Manager of Helium Operations, Bureau of Mines, U. S. Department of Interior, Amarillo, Texas

the Defense Department, Atomic Energy Commission, and other principal classes of consumers. A small amount—less than 1 per cent—is exported.

The general pattern of helium distribution has remained fairly constant for a number of years. The increase in use has been fairly uniformly distributed between federal and non-federal consumers.

• Helium uses

The usefulness of helium derives from its unique physical properties. It is inert. It is lighter in weight than any other gas, except hydrogen. It diffuses more rapidly, flows through a hole faster, conducts heat better, and transmits sound at a higher velocity than any other gas, except hydrogen. It conducts electricity better than any gas, except neon. Compared to other gases, helium has a lower solubility in water and other liquids, lower refractive index, and lower temperature of liquefaction. These unique properties are useful for many industrial and scientific applications.

Helium is used almost exclusively as the lifting gas for airships and for observation, advertising, meteorological, and toy balloons. At normal atmospheric pressure and 60 deg F, 1000 cu ft of helium weighs only 10.54 lb and provides a lift in air of more than 65 lb—92.64 per cent as much as hydrogen.

Helium is used as an inert gaseous shield around the arc and molten metal during some arc welding operations on aluminum, copper, titanium, magnesium, stainless steel, and other metals. An inert helium atmosphere is used in the production and fabrication of titanium and zirconium.

Transistor crystals of silicon and germanium are grown in helium to protect these semi-conductor crystals from exposure to air during their growth.

Helium is used in chromatographic gas analysis equipment as the carrier or sweep gas. It aids materially in modern techniques for rapid and accurate analyses.

Helium is used with oxygen in breathing atmospheres for persons suffering from asthma and other respiratory diseases. The helium-oxygen mixture is much lighter than air and will flow through restricted respiratory passages more readily. Consequently, more oxygen can be breathed with the same muscular effort. Helium is mixed with some anesthetics to reduce explosion hazards in hospital operating rooms.

Helium-oxygen breathing mixtures are used also by divers in deep-sea rescue and salvage operations. The low solubility of helium in the blood stream—as compared to nitrogen from the air—minimizes dizziness and loss of mental agility when breathing these mixtures under pressure.

In some instances, helium has been used as a tracer element added to natural gas that is injected into underground reservoirs to determine the underground movement of the injected gas in cycling and pressure maintenance in oil and gas fields.

Helium is used to detect minute leaks in pressure and vacuum systems, such as vessels for nuclear energy investigations and sealed refrigeration units.

Because of its low refractive index, it is used to fill the space between lenses in range finders and other optical instruments.

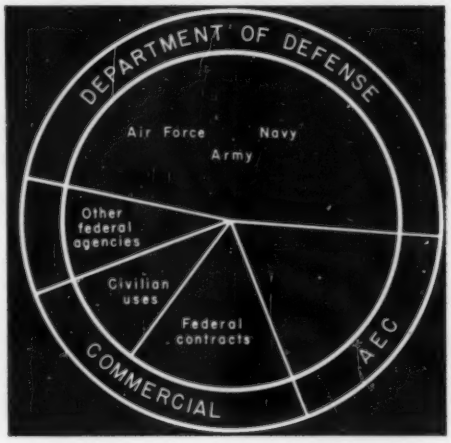


Fig. 2. Approximate distribution of helium use by principal consumers.

It is useful as a heat-transfer medium in gas-cooled nuclear reactors because of its heat capacity and resistance to radioactivity.

Helium is used in a variety of ways in ballistic missile fabrication and operation. It is used in shielded-arc welding of special metals and alloys used in fabrication. It is stored under pressure in the missiles to pressurize fuel components and to accomplish other operational features.

The extreme cold obtainable with liquid and solid helium—near absolute zero temperatures—has opened a broad field of research on properties of material and physical laws at extremely low temperatures. Research on "free radicals" is an important phase of scientific investigation that is facilitated by liquid helium. Free radicals are molecular fragments normally having a life of a few thousands of a second during chemical reactions, but "freezing" them in liquid helium can extend their life indefinitely. The frozen free radicals can then be studied with comparative ease. It may be possible to control the release of their energy and provide a useful source of power. The high energy levels and low mass involved may make this power especially useful in space flight.

At the temperature of liquid helium, some metals become superconductors; they exhibit little or no resistance to the flow of electricity. This phenomenon has led to the development of instruments called cryotrons, which are operated in baths of liquid helium to perform the function of transistors or vacuum tubes and permit construction of extremely small, highly reliable computers.

MASER (microwave amplification by stimulated emission of radiation) and other low-noise amplifiers operating in baths of liquid helium give about 1000 times the amplification obtainable from conventional systems of equivalent size and power requirements.

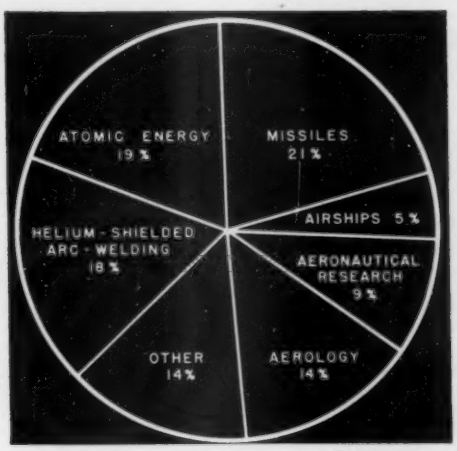


Fig. 3. Approximate distribution of helium for various uses.

The increased amplification is important in ultra-high frequency communications, radar, and radio astronomy.

Fig. 3 shows the approximate distribution of helium among various consumers. A survey was made in 1955 of the commercial (non-Federal) uses of helium. *Table 1* gives the results, which indicate, among other things, that a little over 50 per cent of the helium sold to commercial consumers was used on Federal government contracts, so that nearly 90 per cent of the helium produced was used directly or indirectly for the benefit of the Federal government.

• Production process

Helium is a minor constituent—usually less than 2 per cent—of some natural gases. It is extracted by liquefying virtually all of the other constituents in the gas and then separating the helium-rich gas phase from the liquid phase. All Bureau of Mines helium plants use the same basic low-temperature process involving first, the extraction of "crude helium" and second, its purification.

At extraction plants, helium-bearing natural gas at about 450-lb pressure—either supplied to a plant at that pressure or compressed in the plant—is treated chemically by an amine-glycol-water solution to remove carbon dioxide and hydrogen sulfide, and then is passed through a desiccant to remove water vapor. The gas stream thus "cleaned" is sent to crude helium extraction units. These units use a regenerative low-temperature process wherein the incoming gas is cooled in heat exchangers by previously liquefied natural gas leaving the unit. The incoming gas, thus cooled and almost completely liquefied, is throttled into a separator operated at about 200-lb pressure and about minus 260 deg. F. There phase separation is made. The liquid phase passes through heat exchangers, as mentioned above, to cool the incoming gas stream, then compressed if necessary to restore the supply pressure, and discharged from the plant. The helium-rich gas phase is subjected to moderate rectification by cooling with liquid nitrogen from an auxiliary refrigeration cycle. This produces a crude helium product stream containing about 65 per cent helium, 34 per cent nitrogen, small quantities of hydrogen and neon, and a trace of methane.

The crude helium stream from the extraction units—usually less than 3 per cent of the volume of natural gas processed—is mixed with a small quantity of air and passed over a platinum catalyst to oxidize any hydrogen present to water vapor. The stream is dried by passage through desiccants, compressed to about 2700-lb pressure, dried further by passage through desiccants, and then goes to helium-purification units.

The purification process takes place in three steps, at about 2700-lb pressure, and at temperatures provided by liquid nitrogen. Pure helium from the final purification step passes directly to loading and shipping facilities.

In the first purification step, a single-stage separation is made in a separator surrounded by liquid nitrogen at atmospheric pressure and about minus 320 deg. F. The gas phase from this separation contains about 98.3 per cent helium. This is passed directly to the second step.

In the second step, a single-phase separation is made in a separator surrounded by liquid nitrogen boiling at reduced pressure and about minus 340 deg F. The gas phase from this separation contains about 99.5 per cent helium, which is passed to the third step.

In the third step, the helium stream is passed through activated charcoal in vessels surrounded by liquid nitrogen. The process is made continuous by providing two sets of charcoal adsorbers so that one

TABLE 1. Helium uses by commercial (non-Federal) consumers

Uses	Per cent of Total Commercial Use	Division of Use	
		Per cent for Federal Contracts	Per cent for Other Purposes
Welding	64.5	52.3	47.7
Leak Detection	8.5	31.7	68.3
Titanium production and fabrication	7.5	83.9	16.1
Research	5.1	63.2	36.8
Controlled atmosphere	5.0	22.5	77.5
Medical	2.6	0.0	100.0
Transistors	2.3	67.1	32.9
Zirconium production	1.6	100.0	0.0
Aircraft components	1.5	99.0	1.0
Advertising and toy balloons	0.6	0.0	100.0
Lighter-than-air crafts	0.6	0.0	100.0
Miscellaneous	0.2	27.1	72.9
Total	100.0	51.8	48.2

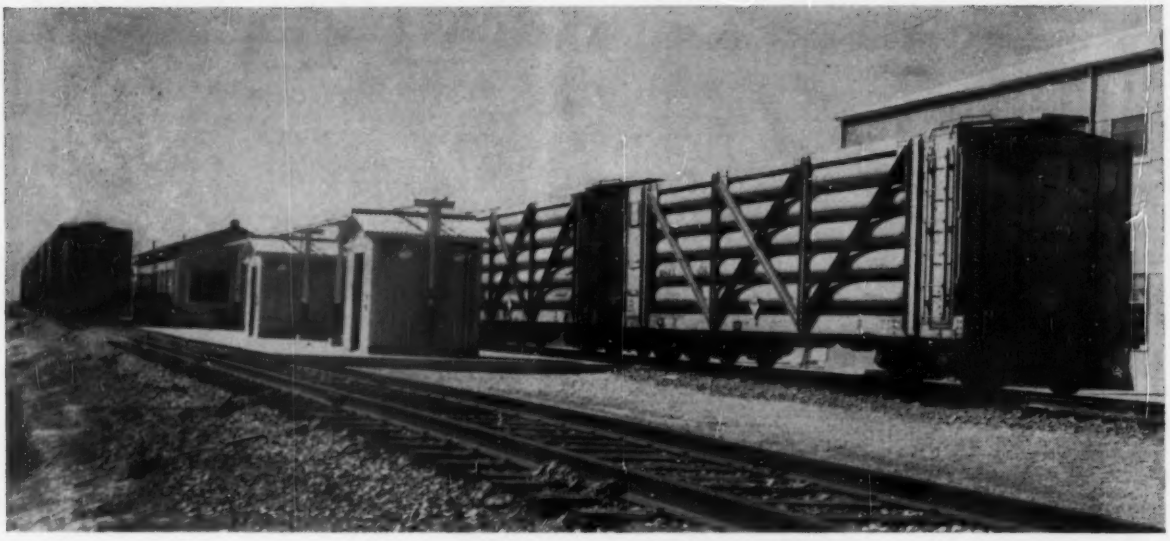


Fig. 4. Helium loading station and tank cars at Keyes plant.

set may be reactivated—by heating—while the other is in use. The charcoal removes residual amounts of nitrogen and hydrogen, and part of the neon to produce a final product containing less than 50 parts per million of impurities—that is, 99.995 per cent pure helium. Pure helium is passed directly to shipping containers or to diaphragm-type compressors which boost the pressure to as much as 4000 psi, the maximum allowable filling pressures of some shipping containers.

In a forthcoming Bureau of Mines Information Circular, W. M. Deaton and R. D. Haynes of the Helium Activity describe in more detail the helium production process as applied at the Keyes plant.

• Process and equipment improvements

A number of process and equipment improvements are incorporated in the Keyes plant. The following are the most significant.

1. The natural gas and product streams are cleaned thoroughly to remove oil mist and vapor, water vapor and carbon dioxide that would foul heat exchanger surfaces or plug equipment by forming solids at low temperature. The low-temperature units may be operated for six months or more without requiring shutdown for thawing and deriming. The initial treatment of the natural gas stream reduces the carbon dioxide content to less than 0.005 per cent and the water vapor content to less than 4.1 parts per million (dewpoint of minus 40 deg F). The crude helium stream is dehydrated to provide a water vapor content of less than 0.7 parts per million (dewpoint of minus 40 deg F at 2700-lb pressure). The compressed nitrogen used in the auxiliary refrigeration cycle is passed through activated bauxite to remove any oil mist and to keep it virtually bone-dry of water vapor. The Keyes plant uses pressure vessels for dry storage of crude helium and nitrogen instead of water-sealed holders of the type used in previous helium plants. This is of material benefit in maintaining clean, dry gas streams, as well as effecting substantial savings in investment and operating costs.

2. Use of large processing units, particularly for crude helium extraction, gives material savings in investment and operating costs. Each of the three crude helium units can process about 25 MMcfd of natural gas. This is twice the capacity of units installed in any previously constructed helium plant and 10 times the capacity of units used in plants prior to 1956. The larger units decrease the proportionate heat leak and greatly improve the use of refrigeration.

3. The Keyes plant uses about 97 installed hp per MMcf of gas processed per day for crude helium extraction and about 960 installed hp per MMcf of crude helium purified per day. This is 47 per cent and 32 per cent less, respectively, than accomplished in most previous operations, although an addition to the Exell plant in 1956 closely approached it. These improvements have been accomplished by improved heat exchange and improved use of refrigeration. Additional major reductions in power requirements appear feasible with improved equipment and some process changes.

4. The initial gas treatment equipment and the low-temperature processing equipment are controlled automatically from a central control room, with corresponding benefit in the smoothness, efficiency, and economy of operations.

• Helium shipment

Most of the helium produced—over 80 per cent—is shipped in railway tank cars of special design and construction shown in *Fig. 4*. The cars have capacities of 215 Mcf to 300 Mcf, depending on the permissible

filling pressures, which range from 2400 to 3600 psi. The balance of the helium produced is shipped in automotive trailers and small cylinders.

The present retail price of helium in tank car lots is $15.50 and $19 per Mcf to Federal and non-Federal consumers, respectively. The average cost of helium transportation in tank cars from plants in Texas and Oklahoma to the East and West coasts is in the general range of $6 to $9 per Mcf, depending on capacities of cars, particular destinations, and other factors.

The Navy Department and the National Bureau of Standards Cryogenic Engineering Laboratory have been quite active in investigating shipment of helium as a liquid [1, 2]. The Navy Department and the Air Force are now engaged in a joint operation to test a moderate-size helium liquefier, automotive transport for liquid helium, and liquid helium handling equipment. Prospects appear favorable for practical large-scale shipment of liquid helium with greater economy and convenience than afforded by present shipment as a compressed gas.

• Technical and cost data

The Bureau of Mines has compiled recent reports on phase equilibria data for three typical helium-bearing natural gases at temperatures and pressures of interest in helium extraction. Also, a report has been prepared on investment and operating costs for the two largest plants—Exell and Keyes. These reports are on "open file" and available for inspection at the Bureau of Mines, Helium Activity offices in Amarillo, Texas, and Washington, D. C.

• Helium resources and conservation

For nearly 40 years, the Bureau of Mines has conducted a survey to obtain and analyze samples of natural gas from wells drilled in the United States in exploration for oil and gas. Where important, information is obtained also on the geology, reservoir characteristics, and estimated gas reserves. The purpose is to detect the occurrence of helium and evaluate the nation's helium resources. The results of gas analyses made in this survey have been published by the Bureau of Mines [3, 4].

Table 2 gives a summary of principal known helium resources in the United States by geographical location and separated into primary and secondary resources depending on the quantities available and economical recovery factors. It will be noted from this summary that all the primary resources are contained in natural gas reserves in the Texas Panhandle, Oklahoma Panhandle, and western Kansas. This gas is being transported to fuel markets at rates which will deplete the fields in about 25 years, at least from the standpoint of practical large-scale helium extraction and recovery. Existing helium plants in the area have the capacity to extract only about 15 per cent of the helium from the gas being transported.

The recoverable helium in the primary resources is about 130 billion cu ft. While this reserve of helium-bearing gas is relatively large, the fact remains that, even at the present rate of use, about 4 billion cu ft of helium is lost annually as the natural gas is consumed as fuel. Depletion of the helium resources is predictable and foreseeable. Thus, the nation is confronted on one hand by rapidly increasing use and importance of helium—for essential defense activities and valuable technological developments—and on the other hand by relatively rapid depletion of its primary helium resources. A logical course of action is to stop loss and waste of a major part of this helium by extracting and recovering helium from natural gas en route to market. To this end, the Department of the Interior in 1958 developed a long-term and large-scale conservation program. Legislation to accommodate the program was passed recently by the Congress and approved by the President. The bill becomes effective March 1, 1961.

The program involves construction of a number of helium-extraction plants on natural gas transmission lines to extract the helium from natural gas en route to fuel markets. The department would endeavor to interest private industry in financing, constructing, and operating the plants. The product stream from the plants would be in the form of crude (unpurified) helium. It would be purchased under long-term contracts by the department for transportation to, and underground storage in, the Government-controlled Cliffside gas field near Amarillo.

The predicted production and disposition of helium in the period 1960-1985 is shown in *Fig. 5*. Curve "A" is the estimated annual availability of recoverable helium in natural gas that will be transported to fuel markets during the specified period from the most

TABLE 2. Principal helium resources of the United States[1] (billions of cubic feet at 14.65 psia and 60 deg F)

Geographical Location	Primary Resources[2]	Secondary Resources[3]	Total
Arizona	....	0.6	0.6
Colorado	....	0.6	0.6
New Mexico	....	0.2	0.2
Texas-Oklahoma-Kansas[4]	161.7	28.4	190.1
Utah	....	5.8	5.8
Total resources	161.7	35.6	197.3
Total recoverable helium[5]	130.0	29.0[6]	159.0

[1] Estimate July 1960 of helium resources in place in natural gas reservoirs—helium content 0.3 per cent or more.

[2] Primary resources defined as those sufficient to provide 100 MMcf of recoverable helium per year for a 20-year period at individual plant sites.

[3] Secondary resources defined as those not sufficient to provide 100 MMcf of recoverable helium per year for a 20-year period at individual plant sites.

[4] Includes Texas Panhandle, Hugoton, Keyes, Greenwood, Cliffside and some smaller gas fields in the Texas Panhandle, Oklahoma Panhandle, and western Kansas.

[5] Estimate of recoverable helium from helium resources; takes account of unavoidable losses in processing, optimum economical plant capacity, seasonal fluctuations in helium-bearing gas supplies, field abandonment upon depletion, and other factors.

[6] Recoverable helium from secondary resources could vary widely, depending on economic choice of plant size and life, quantity of resources, helium content, conditions of gas availability, gas composition, and other factors.

practical recovery sites on pipelines originating in the aforementioned three-state area. Curve "B" is the predicted annual consumption during the period. Curve "C" represents the predicted annual output of the five existing production plants, which will have to be augmented soon by purifying a part of the crude helium from conservation plants and, thus, will meet market demands represented by Curve "B".

The area between Curves "A" and "C" represents a volume of helium amounting to about 77 billion cu ft that could be recovered at helium conservation plants. The area between Curves "A" and "B", representing about 52 billion cu ft of helium, is that which it is estimated could be stored underground for future use beyond 1985. The indicated volumes that may be extracted and stored will be decreased appreciably by each year of delay in placing the program in effect.

The Department of the Interior believes that the users of helium should pay for the conservation program. The program would be financed by increasing the retail price of helium to defray all costs, including depreciation and interest, over a period of about 25 years. It is estimated that the present prices would need to be increased about $25 a thousand cubic feet. If the present market distribution prevails, Federal agencies, which consume directly or indirectly over 90 per cent of the helium, would pay the major share of the cost of the helium conservation program.

Alternatives to the conservation program have been considered. It seems unreasonable to limit the use of helium when relatively large sources of helium are available. These can and should be used to obtain helium.

It is impractical to contemplate holding the helium-bearing natural gas in the present reservoirs for future use because virtually all of the gas is destined for domestic fuel markets and constitutes the only reasonable, economical, and practical source of domestic fuel.

Dependence on the known helium resources might be satisfactory during the next 10 to 15 years, depending upon the growth in demand. If depletion of the presently known resources of helium is allowed to continue, the nation could be limited in the future to recovery of small amounts at great expense from depleted and marginal sources.

Prospects are not bright for new discoveries of major helium sources in the United States to augment the supply. In spite of extensive exploration for oil and gas, additional major quantities of helium have not been discovered in the past 10 years or more. During the past 30 years, the number of known helium sources has been nearly static for the first 20 years, and, during the past 10 years, has declined steadily because of the consumption of helium-bearing gases as fuel.

There is no reason at the present time for depending on helium sources outside the United States. There are few occurrences of helium in foreign countries and no development of large-scale reserves of helium. The obvious disadvantages are the probable high cost and the uncertainty of availability under circumstances that might arise in the future.

It is impossible to predict what new uses may be found for helium in the future, but it is reasonable to predict from present uses and from the general trend of new uses that a helium shortage could handicap the nation seriously in the maintenance of national defense and in the pursuit of technological developments and improvements. This risk can be eliminated for many years in the future by initiating the helium conservation program now. Officials of government and industry and prominent scientists have concurred with this conclusion. They have endorsed the helium conservation program and urge immediate action now to conserve this unique and useful natural resource. ■

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This article is adapted from a talk presented at a meeting of the California Natural Gasoline Association in Santa Monica, Calif., in October 1960.

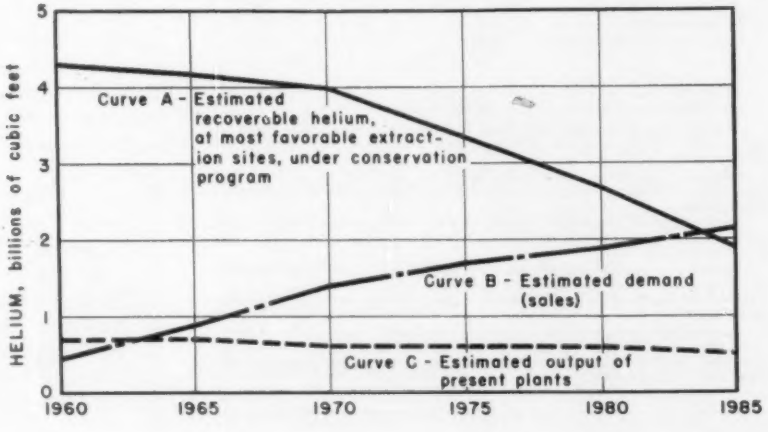
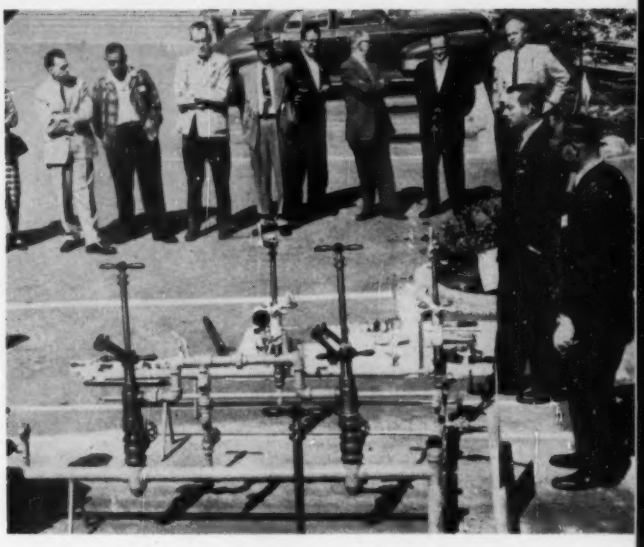


Fig. 5. Graphical forecast, 1960-1985, of helium production, demand and conservation under proposed conservation program.

Enlightening city officials on operating problems



By EDWARD NIEDERER JR., Vice President

Cascade Natural Gas Corp., Seattle

THE Pacific Northwest's skeptical attitude toward natural gas has affected the attitudes of the city officials. It is a major problem that has to be overcome if the gas industry is to progress without undue hardships.

Specialists from many parts of the country gathered in Seattle last June to attend Cascade Natural Gas Corp.'s second annual sales convention for independent gas appliance dealers, installers and city officials. The idea of the convention was to better acquaint city officials with Cascade, its employees and its policies, to prove that we want to become good citizens. This meeting was slanted toward getting cooperation not only from city officials, but from dealers in the service areas. It was felt that such a gathering offered an ideal opportunity to further these relations by having the operating department put on a live demonstration of operating problems.

We feel it is important and helpful for city officials to be informed on the operations and maintenance of a gas distribution system in order to understand problems that arise that might pertain to their particular department. If we are to have the cooperation of our city officials, first they must be educated about our product, its function and problems.

We remembered the old phrase, "a picture is worth 10,000 words" and with this in mind we decided to put on a live demonstration using natural gas, showing what happens when a main or service is broken or on fire and how the flow of gas is controlled and damage repaired.

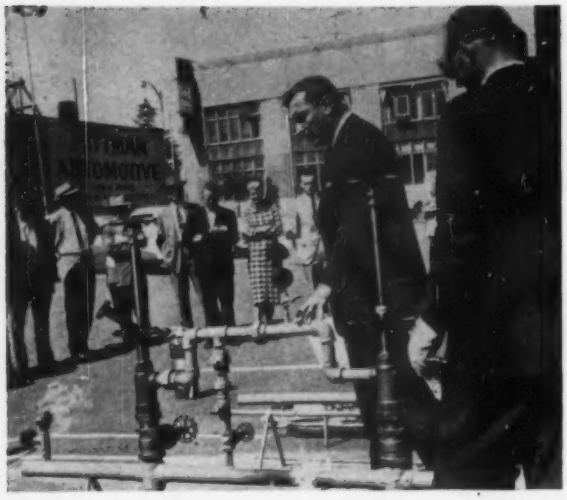
The demonstrations were designed with several objectives in mind: The method of presentation was to be in language that the layman could readily understand and absorb. We would reproduce actual problems that arise in the field and demonstrate the various methods of handling maintenance and repairs. And, we would use natural gas and a live flame to show the ease with which it can be handled. Through these demonstrations we hoped to allay fears instilled by others that natural gas is dangerous. Also, we intended to show officials that the company has the latest in equipment and our personnel is trained in the latest method of constructing and maintaining a distribution system. The company at all times has the public health and welfare of the community in mind in the performance of its work.

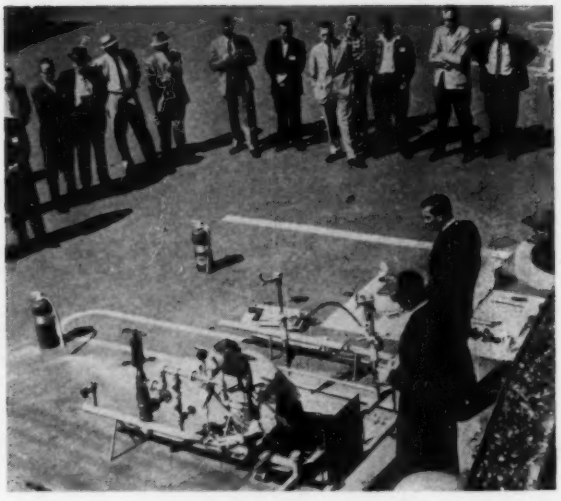
The demonstrations were divided into four sections with each section timed for approximately 20 minutes. An explanation was given regarding the piping and equipment for each demonstration and a brief outline explaining the problem and how it would be handled.

Section I represented a typical service connection and service in a modern distribution system. The problem presented was a service that had been broken by other construction work. The service was on fire. Four different methods were used to show how the flow of gas could be controlled, depending upon the particular circumstances that might exist.

1. Using Mueller equipment, the flow of gas was controlled at the service connection through the Mueller No-Blo service tee.
2. Mueller split control fitting was used to control the situation.
3. After extinguishing the fire with Dew Gas fire extinguisher, a rubber stopper was used.
4. A hydraulic pinching machine was used to stop the fire and flow of gas.

Section II. Demonstration of replacing a section of damaged main. The use of Mueller split line stopper fittings and by-pass piping showed the ability to maintain service to customers while repair work on a one feed main is accomplished. To make the demonstration more impressive, the damaged portion of main was set on fire. A section was actually removed and





a new piece of main welded into place. A small connection at the end of the one feed main was kept burning at all times to visually prove that gas was continually flowing through the by-pass and into the downstream side of the main during the removal and replacement of the section of main.

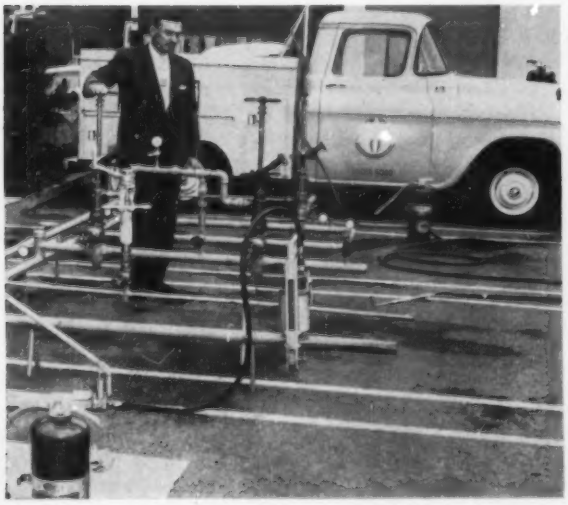
Section III. The fittings and equipment were similar to the demonstration for Section II, except that the case presented was a main having a two-way feed, thereby eliminating the necessity of a by-pass. It was stressed that in a modern distribution system, valves are only installed for purposes of controlling large areas or sections of large mains. Normally in a distribution system valves are in the wrong location to utilize and still effect repairs without interruption and inconvenience to customers. The use and effectiveness of the pipe squeezer to control gas quickly and effectively so that permanent repairs could be accomplished was shown.

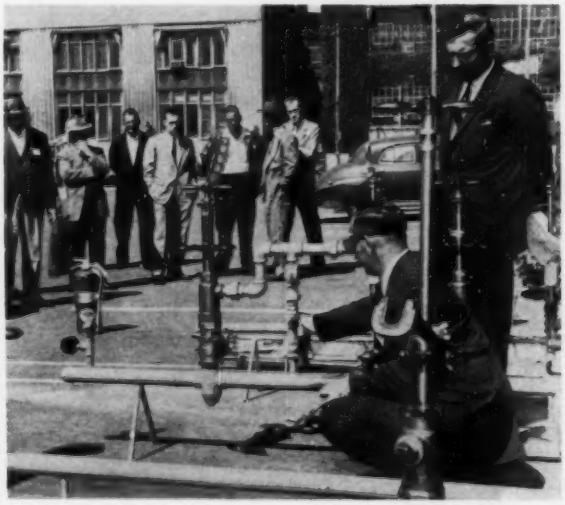
Section IV. This demonstration showed the installation of various types of welded patches and clamps on damaged main.

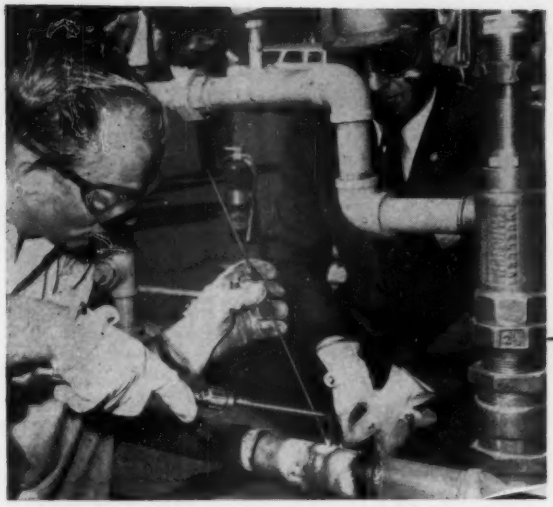
In all instances an explanation of the fittings and equipment being used was given as the demonstration progressed.

The pictures show the piping and equipment as used in the various demonstrations.

The enthusiasm, and questions asked after the demonstration, proved that our city officials are receptive and eager to learn about our product, problems and methods of operation, if we are willing to educate them. They, in turn, understanding and better informed, are able to help us in our efforts to offer the public the highest standards of service. ■







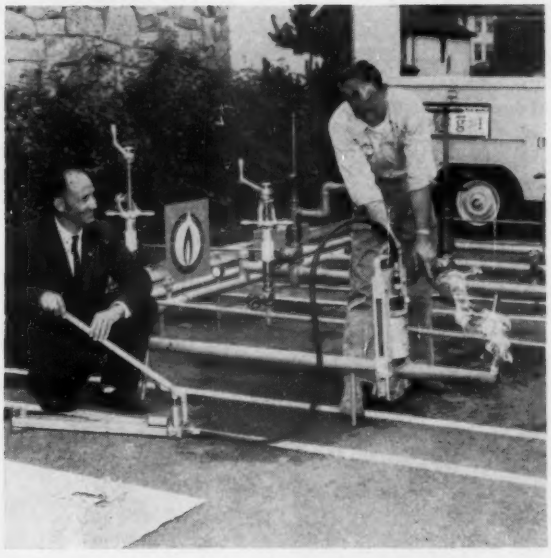
LEFT TO RIGHT:

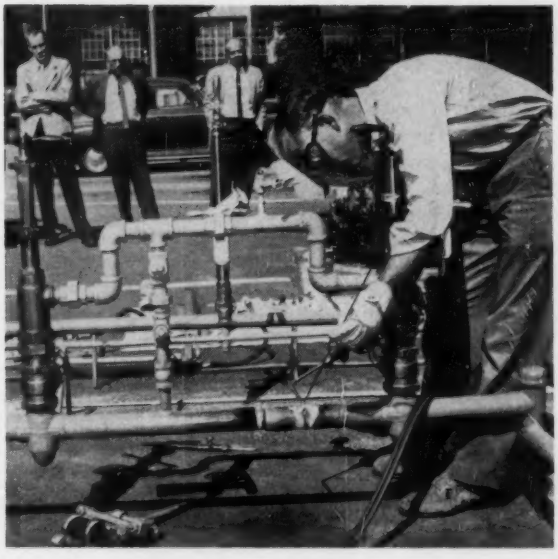
Vice President Niederer explains procedure that will be followed to replace a section of main without interruption to the customer by using Mueller equipment.

Welder Arvine Young replaces section of main that has been bypassed.

Welder Young tacking replaced section of main. Superintendent Bob Feemster holds replaced section of main for tacking.

BELOW LEFT: Feemaster and Young demonstrate use of pipe pinching machine for quick control of broken services or mains. RIGHT: Young completes weld of replaced section of pipe.





LEFT TO RIGHT:

Niederer looks over equipment before starting demonstration.

Feemaster operates bypass equipment while Niederer explains what is happening as equipment is operated.

Young welds replaced section of main while equipment is passing gas around work.

By MICHAEL J. KRAEMER
Executive Consultant
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Why gas utilities require a relatively high earnings rate of return

INVESTORS, in general, concede that natural gas is one of our most valuable natural resources. In the area of cooking, water and space heating, as well as a fuel in many industrial processes, this clean and efficient commodity has price or technical advantages over competing fuels in many areas of the country.

Although investors are quick to acknowledge that the securities of soundly conceived and well-managed natural gas companies are entitled to good investment ratings, they are equally adamant in their attitude and insistence that natural gas securities must be made available on terms more attractive than those which would apply to an electric utility, on a quality for quality basis. The underlying causes of this investor philosophy may be summed up about as follows:

1. Natural gas is a wasting asset and the business of bringing the natural product from the wells to the consuming markets is predicated on long-term contracts between the producers and suppliers which are necessarily limited as to terms.

2. Natural gas has limited uses in the sense that the number of electric appliances available considerably outstrips the number of gas appliances which have been developed; moreover, the typical electric appliance, at the consumer level, can be relatively easily tied into the source of supply without tinkering with plumbing.

3. The weather (which is outside management control) more importantly influences operating results of the gas companies.

4. It has not been easy, to date, to reconcile the views of gas producers with those of the pipeliners and distributing companies at regulatory levels. The three views are interdependent. A clouded regulatory climate dampens investor enthusiasm for natural gas securities. This, in turn, is reflected in open-market quotations in the security markets and the prices investors will pay for presently outstanding or "new money" issues.

On a quality for quality basis, investors in a debt security or preferred stock of a gas utility generally require in yield between approximately one-eighth of 1 per cent and one-quarter of 1 per cent more than they demand on a senior security of an electric utility (in addition to more generous sinking fund and call price provisions and shorter maturities). Investors in a gas company common stock also demand a relatively high rate of earnings on the equity. These conditions have obtained for many years and are currently in effect so that there is no particular point to be gained now in reviewing the historical record or speculating on future money costs.

(a) At the present time, a broad and representative list of electric utility company common stocks are selling in the open market, on the average, at approximately 18 times common share earnings reported in recent 12-month periods. This is an earnings-price rate of about 5.55 per cent.

(b) In contrast to this, a broad list of common stocks of natural gas distributing companies are currently selling in the open market, on the average, at around 15 times earnings. In other words, these equities are earning about 6.67 per cent on the current open-market price—an earning rate about 20 per cent greater than on electric utilities. This required higher earnings rate applies, of course, to an important segment of the total capitalization.

You are familiar with the reasons why the "cost of money theory" is rejected as a measure of required rate of return. However, the cold fact is this: it weighs heavily on the scales of most rate regulating agencies. Based on present money market and stock market conditions, it can be clearly demonstrated, in a statistical sense, to proponents of the cost of money theory, that a gas distribution company, or the gas division of a combination company, is entitled to an earnings rate of return of approximately six-tenths of 1 per cent greater than that needed by an electric utility company, comparable capitalization ratios assumed in both instances.

1. At the current writing, the cost of high-grade electric utility bond money is in the order of 4¾ per cent including expenses and underwriting costs. The cost of preferred stock capital, in this market, is probably about one-half of 1 per cent higher than bond capital. The current cost of electric utility common stock money is 5.55 per cent based on the present average earnings to price ratio. Or, about 6.17 per cent if a 10 per cent allowance is made for market pressure, "rights value" and underwriting costs and

expenses. If these cost rates are coupled with a capital structure made up of 50 per cent debt, 10 per cent preferred stock, and 40 per cent common equity, the current composite cost of electric utility capital is 5.37 per cent.

Electric Utility	% of Capital		Cost Rate		Weighted Cost	Composite Cost
Bonds	50	×	4.75%	=	2.375%	
Preferred	10	×	5.25	=	0.525	
Common	40	×	6.17*	=	2.468	
						5.368%

*Based on price-times-earnings ratio of 18.0 times; earnings-price ratio at 5.55 per cent with a 10 per cent allowance for market pressure, etc. = 6.17%

2. As opposed to the current composite cost of electric utility capital, computed on the basis of the cost of money theory, as above of 5.37 per cent, the current bare-bones composite cost of gas distribution company capital is in the range of 5.94 to 6.01 per cent.

Illustration A—Assumes cost of bond and preferred stock capital is greater by one-eighth of one per cent

	% of Capital		Cost Rate		Weighted Cost	Composite Cost
Bonds	50%	×	4⅞%	=	2.437%	
Preferred	10	×	5⅜	=	0.538	
Common	40	×	7.41*	=	2.964	
						5.939%

Illustration B—Assumes cost of bond and preferred stock capital is greater by one-quarter of one per cent

	% of Capital		Cost Rate		Weighted Cost	Composite Cost
Bonds	50%	×	5.0%	=	2.500%	
Preferred	10	×	5½	=	0.550	
Common	40	×	7.41*	=	2.964	
						6.014%

* Price-Times-Earnings Ratio = 15.0
Earnings-Price Ratio = 6.67%
10% allowance for market pressure, etc. = 7.41%

Normally, the common stock segment of required capital is the most costly in the sense that it entails the greatest cost rate. In the above illustrations, a uniform common stock equity of 40 per cent has been assumed. As a matter of fact, many sophisticated long-term investors prefer to see a gas distribution company with a comparatively "fat" common stock equity because the typical gas distribution company has a relatively high operating ratio and, as a consequence, it is more highly leveraged than an electric utility operation. If the foregoing statistical illustrations were adjusted to reflect this factor, the current spread in required over-all earning rate of return needed by a gas distributor to attract capital at a reasonable cost and in balanced proportions would exceed six-tenths of 1 per cent. ■

Adapted from the Oct. 27, 1960, issue of *Public Utilities Perspective*.

New Books

Among the non-gas books which have come to GAS for review recently, these three appear to be of more than passing interest to the gas industry:

Directory of University Research Bureaus & Institutes—If you've ever had to find out which schools do research in a certain field, you'll appreciate this reference volume. It lists all university research bureaus, institutes, centers, experiment stations, laboratories, etc., that are set up on a permanent basis. Altogether, there are some 1500 listings in 250 fields, which are divided into 17 major sections for handy reference. Listings are quite complete, including: official name of the bureau or institute, address, name of sponsoring college or university, name and title of director, year founded, size of staff, title and frequency of publications, description of activities, and list of meetings and other events. This durably-bound, 208-page, 8½-x-11 book may be obtained from Gale Research Co. (34th Floor, Book Tower, Detroit 26) for $20.

Labor Turnover: Calculation and Cost—In this AMA Research Study, author Frederick J. Gaudet makes a thorough analysis of all available literature on the calculation of labor turnover and its cost. Material on methods of mathematically measuring turnover covers basic formulas and their variations, frequency of measurement, and turnover comparisons. Cost calculation techniques are reviewed and compared. The effects of absenteeism, accidents, company size, and other general factors are discussed. Possible solutions are studied and specific remedial techniques are described. This soft-bound, 111-page 8½-x-11 book is obtainable from the American Management Association (1515 Broadway, Times Sq., New York 36) for $5.25 ($3.25 to AMA members).

Techniques of Plant Maintenance & Engineering—1960—The 11th volume of an annual series, this book details the proceedings of the 1960 National Plant Maintenance and Engineering Show. In it, are the 34 papers presented, along with the 1883 questions (and, of course, their answers) asked of the people who presented the papers. The papers cover a tremendous range of subjects within the field of maintenance, but perhaps the most interesting to GAS readers would be those on the advance and significance of automation in maintenance operations. This hard-bound, 341-page, 8½-x-11 book may be obtained from Clapp & Poliak Inc. (341 Madison Ave., New York 17) for $10.

Everybody—304 out of 307 employees—attended one of the two one-day Selling Symposiums staged by North Shore Gas Co. for its employees. Note appliances on stage.

One-day program sells employees—appliances

WHILE the larger utilities are apt to have very adequate formal employee education programs, the smaller ones are more inclined to pass by such projects for one or more of four reasons:

"We don't need it because we aren't so big."

"We can't afford it."

"We don't have the time."

"We don't have professional training personnel."

Smaller utilities, however, can have an informal, bare-bones employee education program which occasionally makes a large "splash." An excellent example of just how successful such a splash can be is the 1960 Sales Symposium staged by North Shore Gas Co. of Waukegan, Ill.

The "North Shore" in the name refers to the northern Illinois shore of Lake Michigan. The 53-year old utility serves approximately 55,000 customers living in 39 communities in the northeast corner of the state. Bounded on the north by the Wisconsin state line and on the south by Chicago suburbs, its operating territory is about 30 miles long and goes about 12 miles inland. Exactly 307 employees are scattered over this 275 square mile area with the farthest employees about 20 miles from Waukegan.

Several years ago, North Shore held a one-day employee meeting called E-I Day, Employee Information Day. The success of this first program prompted the company to decide to hold a similar program in 1960. This one was called a Sales Symposium.

The reasoning behind this decision was lucidly given in a "Memo from the Coach" (President Roy E. Jones) appearing in the Employee Reference Manual mailed to employees the day after the program.

"Would you be impressed by a Chevrolet salesman who drove a Ford? Of course not! Would you expect a mechanic or a cashier employed by an auto agency to know the fine qualities of their cars, even if his or her job did not include sales to customers? Probably, you would. Frankly, we are in the same position here at North Shore Gas. There are about 20 people in the sales department and 14 times that number are employed in other jobs. So, it seems to make sense that we should try to learn more about what is new in gas appliances so all of us can feel competent to talk about them to our families, our friends, or anyone who will listen."

To help its employees learn about "what is new in gas appliances," North Shore assembled 28 of the most modern models on a stage. It also assembled a group of teachers one official of the company proudly labeled "the best talent in the business." Among the teachers: Chet Stackpole, managing director, AGA;

Carl Sorby, vice president, Geo. D. Roper Corp.; Jessie Cartwright, national home service director, Norge Sales Corp.; Lou Snyder, national sales training manager, RCA-Whirlpool Corp.; LeeRoy Harling, sales training manager, Harper-Wyman Co.; and Ken O'Gorman, central division manager, A. O. Smith Corp.

"There was considerable planning in advance," Sales Vice President Jerome P. Happ explained, "to be sure that everything would be properly coordinated to coincide with the speakers' other committments before and after our program."

The same program was staged on succeeding days with half of the employees going each day. Thus, every single employee was able to attend one session—with the exception of three plant men.

The program began at 9 a.m. and went right up to 4:25, the only interruptions being a 40-minute lunch and two 20-minute coffee breaks. After five minutes of singing and music, Happ led off with a 10-minute welcome and introduction. This was followed by 10-minute speeches by President Jones and Personnel Director Harold Dunn. Then the real education began with Snyder's 45-minute presentation on the Whirlpool refrigerator. After the morning coffee break, Harling told the "Top Burner Story" in 30 minutes and Miss Cartwright and an assistant presented a one-hour laundry skit. Three North Shore sales people led off the afternoon session with 25 minutes on air conditioning, 10 minutes on gas lights and the Blue Star Home Promotion, and 10 minutes on incinerators. Then came two 45-minute presentations, O'Gorman on water heaters; and Sorby on cooking, oven, broiler, and rotisserie. After the afternoon coffee break, two more North Shore sales people reviewed the company's Prospect Program and its Hi-Load Commercial Water Heating Campaign, taking 15 minutes for both. Then, the main address, "The Gas Industry—Old in Birth Date, Young in Outlook," was presented in 50 minutes by Stackpole. Happ's five minutes of closing remarks brought it up to 4:25.

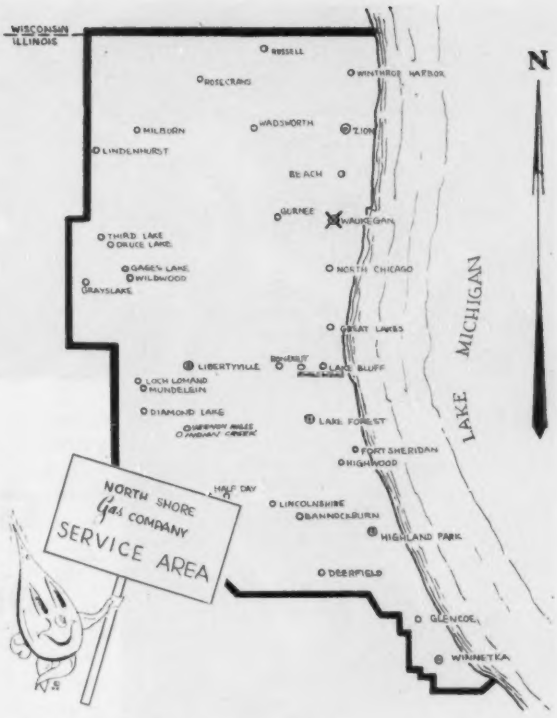
The 16-page, 8½ x 11 booklet mailed out to employees reviewed much of the appliance material presented during the program, in addition to a considerable amount of useful facts and figures about the company.

Perhaps the most important part of the booklet was that detailing the Employee Purchase Plan. As a further incentive for employees to become acquainted with gas appliances, a special 60-day Employee Purchase program was offered with all appliances going at cost plus 10 per cent and no installation or finance charges. A total of 76 employees—more than 21 per cent of the company total—took advantage of the opportunity.

Also, a special employee prospect program was put into effect during the same period.

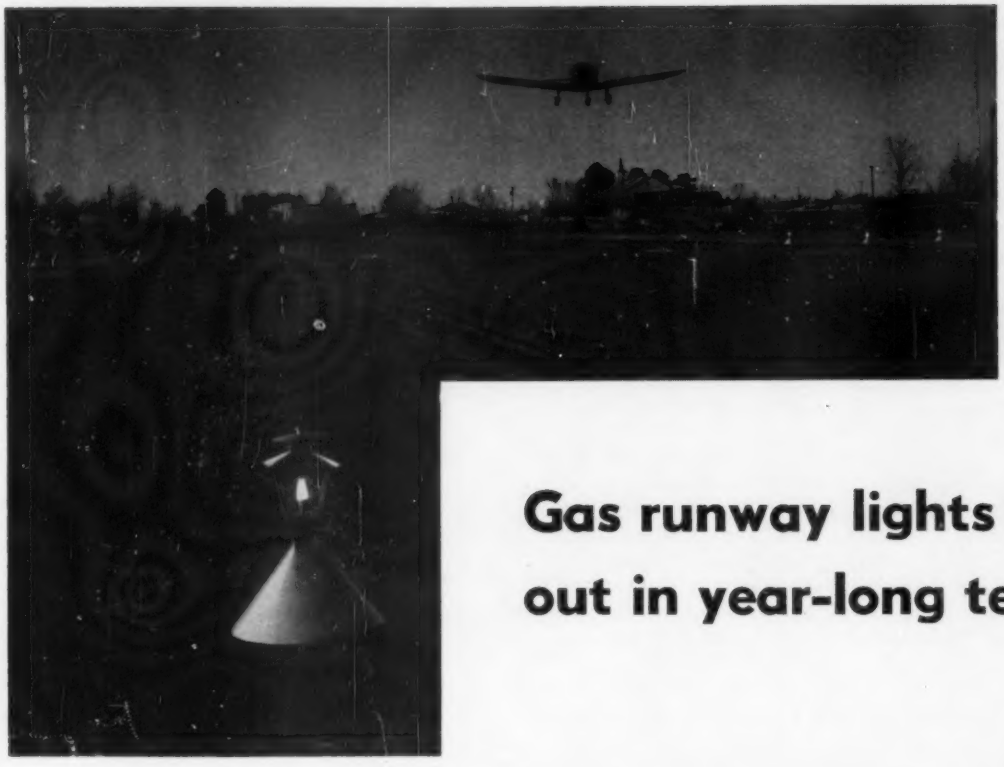
Was it worth the work and expense? Happ certainly thinks so:

"As a result of our Sales Symposium, I believe I can safely say that North Shore Gas is a better informed company, a stronger company, a company whose employees feel that they are part of a team. We would highly recommend that other companies put on similar employee programs." ■



The North Shore Gas service area measures approximately 12 x 30 miles and contains 39 communities. Coming from Winnetka, farthest employee had to travel only 20 miles.

AGA Managing Director Chet Stackpole headed a name line-up of "teachers." Note sign at right showing retail price of gas light and special employee price. Such signs were on all appliances.



Gas runway lights prove out in year-long test

GAS runway lighting has passed the acid test of a year's experience and, in fact, is fast becoming an important fixture on the aviation scene.

In the last year, more than 500 gas lights have been installed or ordered for eight airports in Arkansas, Louisiana, Kansas, and Canada. Arkla Air Conditioning Corp., Little Rock, producer of the lights, reports widespread interest in this new form of runway illumination from as far away as Toronto, Canada, and anticipates that the ranks of gas-lighted airports will swell considerably in the next year.

Arkansas, where the pioneering work with gas runway lighting was done, has earned the title of "Airport Gaslight Capital" with five gas-illuminated fields —at Benton, Gurdon, McCrory, Lewisville, and Springdale. These new gas "pilot lights" also are glowing at Minden, La., and Phillipsburg, Kan. In addition, an airport at New Market, Ontario, Canada, has installed gas runway lights. It is served by Consumers Gas Co., Toronto.

So far the application of gas lighting for airports has been limited chiefly to small fields. In most cases, the lights are in use at airports which otherwise might not have night lighting facilities, and where a relatively low-cost gas supply was readily available. Nearly all are "flying farmer"-type strips with primarily noncommercial, private traffic.

For a detailed look at gas runway lighting, let's examine a typical installation at Saline County Airport in Benton, Ark., the first to go in. Completed in early 1959, it consists of 52 Arkla Gaslites which the company adapted especially for this purpose, in cooperation with Arkansas Louisiana Gas Co., which actually designed and put in the system.

Forty of the gas lights illuminate the 3100-ft runway—20 on each side at 130-ft intervals (see partial runway diagram). Six threshold lights are at each end, with three on either side of the approachway. The runway lights have clear glass lens, the threshold lights green lens.

The light itself (see drawing) is a modified Doorman model Gaslite mounted atop a 9-in.-high sheet metal cone, both painted International Yellow. The cone is anchored to the ground with 2-in. steel pipe which is fastened to it with brackets. One-quarter-inch copper tubing leads from the underground gas source through the larger pipe to approximately 4 ft of similar tubing coiled up inside the cone which feeds gas to the light's burner. Over-all height of the gas light itself is 12 in. The distance from the ground to the top of the light is about 27 in.

The over-all system is comparatively simple. A 1¼-in. underground steel pipe (some airports have used plastic pipe) carries natural gas from the air-

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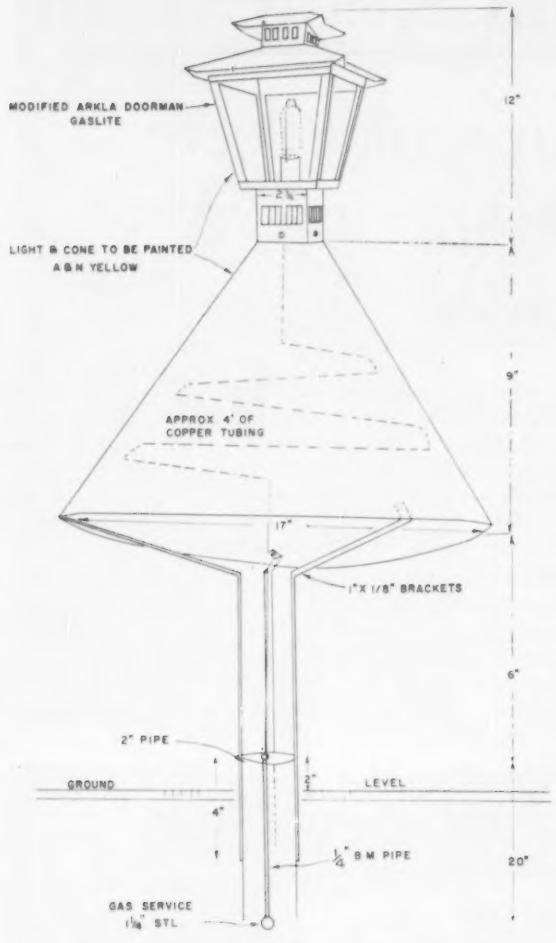


Typical gas light installation at Benton airport.

port's already established supply source at the main hangar to a point just north of the runway. From here it branches out to feed the lights hooked, in effect, in "parallel" along each side of the asphalt landing strip. Each branch terminates at the threshold lights at the opposite end, so it is not a closed loop (some other installations are "looped across").

The Benton airport system is controlled by a photoelectric cell that responds to light changes from normal nightfall to heavy overcast. As darkness increases, the cell increases gas pressure to each gas light by means of a master solenoid valve, in turn raising the flame. Thus during maximum light in the daytime, the lights burn at minimum flame; during nighttime periods of minimum light, the reverse occurs.

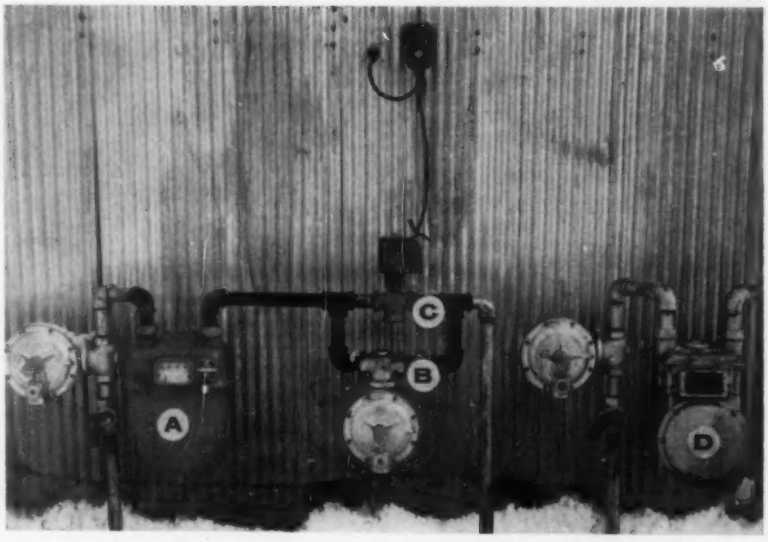
Each lamp is originally lighted by tilting back the top and holding a match near a mantle made of heat-resistant cloth which fits over the open flame. The gas light's blowout-resistant design allows it to withstand high winds (while still allowing for heat dissipation through top vents).

After the original lighting, the Benton airport's photoelectric control system took over. It is pointed out that such an automatic system is not always necessary, for a multiple-gas light installation can be controlled manually. All an airport attendant needs to do is operate one master valve to turn the pressure in the gas light line up or down.

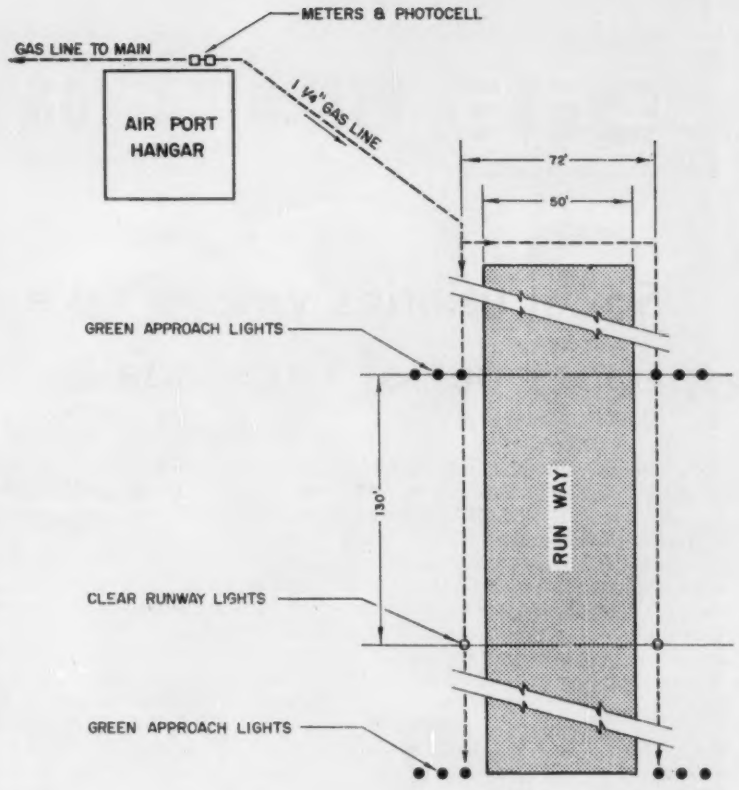
What, if any, are the advantages of gas lighting for airports, compared with conventional electric systems?

Operating costs can be low. Frank Shanks, district manager for Arkansas Louisiana Gas Co. in Benton, calculates the average monthly gas consumption of the runway lights since the photo-cell was installed at about 50 Mcf. At the prevailing rates in the area, this puts the cost of gas for the entire lighting system at less than $1 a day. A special meter measures the precise amount of gas consumed by the lights.

The original installation cost also can run sub-



At Benton airport, gas from existing supply source flows through pressure regulator and meter (A) to set of pipes in middle. During the day, just enough gas flows through bypass (B) to keep runway lights on minimum flame. At night, photocell (on hangar wall at top), sensing a minimum of ambient light, causes solenoid valve to open and gas at normal design pressure to go through line (C) directly to the lights, raising flame on each. Meter (D) serves hangar and airport offices; Meter (A) measures gas consumed by gas lights.



Partial diagram of gas runway lights at Benton, Ark.

stantially lower with a gas system. Normally, the price of each current Arkla gas runway lighting unit is around $20 plus installation. Many gas companies will charge little or nothing for installing to get this profitable extra gas load. Laying underground electrical conduit is often more costly than putting in gas pipe. Another factor is that, in some cases, a nearby gas main or distribution line can easily be tapped at minimum cost, whereas relatively expensive electric facilities might be required. Total price of the 52 Benton gas lights was $1000.

Another advantage is that each gas light is an independent unit. Since complete gas system disruptions are rare (all facilities are underground, unaffected by weather), failures are limited to individual lights. With a power failure, an entire electric lighting system would go out. Also, with gas lighting, no emergency power equipment is necessary, as it sometimes is with electric systems.

Still other advantages: Gas lights require little maintenance; with normal servicing, they have a potential life expectancy of over 20 years. The lights have a soft, pleasing glow—a boon to glare-wary night fliers.

During its initial year, gas airport lighting also has encountered its problems—and has solved most of them. A big one at Benton, according to district manager Shanks, has been glass breakage, which in turn causes blowout. The gas company intends to remedy this by substituting a translucent heat and shatter-resistant plastic material for the glass previously used.

A big target for the runway gas light designers has been safety. A built-in safety feature is the coiled-up copper tubing inside the position marker cones. This is so that, should a plane strike a light, it would bend back, rather than break. Experts point out that a heavy impact to the mounted light would destroy the mantle, and hence the gas flame.

Most of the airports which have "gone gas" with their lighting report favorably about the results. Comments from pilots indicate that the gas lights are highly effective for night time use, particularly in penetrating through weather.

"We've also noticed a considerable increase in our air traffic since the airport became usable at night," reports gas company manager Shanks at Benton (population: 10,000).

Besides better business for airports which otherwise might have to shut down at dusk, in at least two instances, the gas lights have brought even more dramatic results.

At Gurdon, Ark., recently, a pilot nearly out of fuel made an emergency landing by gas light. He claims he could never have made the next major field. And in Russellville, Ky., two Army helicopters caught in a blinding snowstorm made an emergency landing in a parking lot illuminated by gas lights. Though not used for their intended purpose in this case, they were credited with saving the two craft and their six crew members. ■

SoCal utilities vow to take pepper out of Enchilada Inch

AN almost audible, but certainly unofficial, sigh of relief was heard to issue from the halls of Southern Counties Gas Co. and Southern California Gas Co. (both Los Angeles) when California Gas Transmission Co. (a West Coast-based unit of Tennessee Gas Transmission Co.) and Southern California Edison Co. (a Los Angeles area electric utility) filed applications before California's PUC to import gas through Mexico for exclusive use in Edison's thermo-electric plants. (See p. 122 for details of the pipeline project.)

• Out in the open

Succor sprang from, probably, emergence of the plans from a valley of rumor and confusion into the open country of on-the-record fact. The Southern California distributors may feel that on the flats they can circle up the train of propositions and fling a few arrows for their side. We noticed an upswing of confidence from SoCal and SoCounties, due, we think, to their apparent feeling that in a fair fight on PUC fields, they can show the proposition to be considerably deficient of a public interest concept.

And fight they will, according to F. M. Banks, president of SoCal, speaking for both his company and SoCounties Gas. Said he: "Under our present public utility method of operation, the needs of all gas users —large and small—are pooled together on an equitable price and supply basis.

"This pooling of supplies and facilities results in low prices" to all. But if a few large industrial customers are allowed to engage in a private deal which reduces this volume, it will leave the small users to pay the entire costs of the expensive transmission and distribution systems from Texas and the Midcontinent. The end result is higher gas rates. Hence, "in the public interest and in the name of our 8 million household gas users, we will oppose this in formal hearings before the California Public Utilities Commission, as well as the Federal Power Commission, should the proposal come under the scrutiny of that body," Banks declared.

The gas distributors would be boosted almost to Cloud Nine—probably Cloud Six or Seven, anyway—if FPC came romping in with a favorable decision on El Paso Natural's Rock Springs project as a sort of hydrocarbon Christmas gift. With this bundle of new gas supply in their stocking, the Pacific Lighting people would or will make fairly gay times out of New Year's Eve events. It could be expected that El Paso Natural folks would likewise contribute a conservative nip-up or two, as long as no one heard about it.

• Powerful inhibitor

Certainly Rock Springs would be a powerful inhibitor to dangle before a California PUC considering the pleas of a fourth pipeline company desiring to bring natural gas into the land of orange trees, bayside beatnicks, and high taxes.

We are inclined, however, not to pay too much attention to the outcome of the Cal-PUC hearings as this "case" may well see more courtrooms than a stiff-fingered pickpocket. And the U. S. Supreme Court already has a matter before it that applies in the form of the Consolidated Edison - Transcontinental Gas Pipe Line's famous X-20 service case.

That one involves transportation gas with Transco doing the transporting function to deliver gas Consolidated Edison Co. of New York plans to buy directly from producers for use under its steam generators. FPC said no to this, but a U. S. Circuit Court of Appeals said no, that FPC couldn't say no, so this currently reposes in Supreme Court. In question is the extent of FPC's jurisdiction over transportation gas in interstate commerce.

• Another question

Doubtless due for the courts, and possibly clear to the Supreme Court, is the further question: is transportation gas to be moved out of Texas, through Mexico and into California interstate gas?

For, part of the gas California Transmission proposes to bring to SoCalEd's electric plants is Texas gas which the electric utility intends to buy from Humble Oil & Refining Co. This gas will be Texas-produced. It will also be strictly transportation gas.

Edison now has two gas purchase contracts with Humble and a passal more is in the works as we go to press. The other gas for the project will come from Mexico, with TGT selling Edison no United States-produced gas.

So, who needs what papers for which gas to go where should keep the lawyers and judges pretty well confined to the bars of justice for many months, and possibly years.

Pacific Lighting Corp., et al, will probably contend that the Humble Oil purchased gas to be transported by Tennessee Gas, et al, is gas in interstate commerce; hence, is under full jurisdiction of FPC. Since FPC has once said that transportation gas for steam generating boilers is not in the public interest, in the Transco-ConEd deal, this could roadblock that part of the Enchilada Inch.

Southern California gas utilities will further sting with the impact, or effort in, the Rock Springs project. And they will point to their record of meeting all requests by the Air Pollution Control District to furnish natural gas to industry for smog relief as persuasion against SoCalEd's contention that it will need more gas to live adequately with anti-smog rules.

SoCal and SoCounties can be

counted on to work prices over time and again. They will hit hard with their allegation that Edison is paying too much for some of the gas in the Enchilada Inch pipeline. They feel that this more expensive gas can up electric bills and ". . . makes a mockery of federal price policies, as well as other federal regulations and rules."

Cal and Counties have expressed further contention on a Mexican-route project (for 1200 miles) which places about 75 per cent of the pipeline out of range of federal and state regulation, and which could experience curtailments or complete shutoffs. In such events, Edison could demand gas service from its traditional supplier, which might make some problems for Pacific Lighting Corp. and its more steadfast consumers.

The long-term fixed price argument of Edison will probably be assailed.

So, the first round will be fought before the California PUC. Whose arguments will be compelling is something of a moot question at the present time. The importance of these developments is far-reaching. Humble Oil has issued a challenge by specifying in the contracts with Edison that gas it puts into the project will not be resold—hence, it strives to legally sell gas outside FPC jurisdiction. If successful, currently uncommitted natural gas reserves, and reserves of the future, might follow a similar path to the discomfort of regulated pipeline companies, gas distributors, and, ultimately, gas consumers all over the country.

Correction

In the November issue of GAS (p. 77) we credited Northern Natural Gas Co. instead of Northern Illinois Gas Co. with publishing an informative pamphlet telling "Why Gas Is Best for School Heating."

When NI-Gas vice president Henry A. Diekmann told us about our error, he also mentioned that he'd be happy to send a copy of the pamphlet to any reader interested. Contact him at 615 Eastern Ave., Bellwood, Ill.

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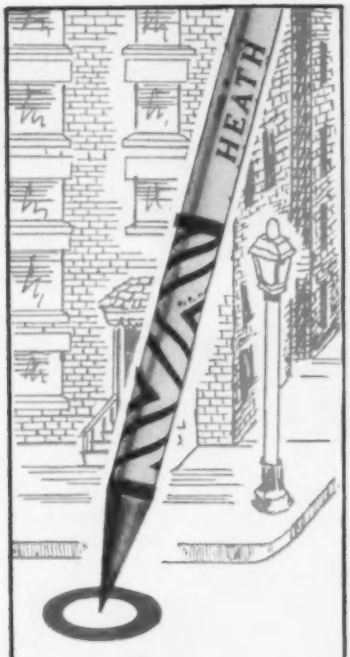

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Milwaukee buys more Wisconsin properties

Milwaukee (Wis.) Gas Light Co. has purchased City Gas Service Inc., Wisconsin Rapids Gas & Electric Co., and Wisconsin Rapids City Gas Co. The $1.6 million transaction includes propane plants, gas service equipment, trucks, etc., at Wisconsin Rapids, Clintonville and Little Chute, Wis.

Also included are the utility propane distribution systems operated by the companies in Wisconsin Rapids, Port Edwards and Nekoosa. Milwaukee Gas completed the $2.8 million natural gas distribution system in the latter three cities.

Pittsburgh lifts ban on gas-fired disposers

Gas-fired automatic smokeless-odorless disposers can be used in Allegheny county, Pa., where the strictest air pollution regulations in the nation are in force.

Approval of the units required a reversal of a long-standing ban on any type of home refuse incinerator in Pittsburgh and the 128 surrounding communities in the county. New regulations were issued after it was proved to the satisfaction of the director of the County Smoke Control Bureau and his staff that the new disposers can incinerate food waste and refuse without giving off any trace of smoke or objectionable odors.

Bureau director Herbert J. Dunsmore said "By lifting the ban . . . we are trying to provide Allegheny county residents with another means of aiding in efforts to achieve cleaner skies here."

City Gas of Florida acquires 20th property

City Gas Co. of Florida purchased the total assets of Miami Bottled Gas Corp. for over $2 million.

This is the seventh company City Gas has acquired during the past 20 months, and brings 23,000 new customers to the City Gas roster. City Gas now serves 85,000 customers from Homestead to southern portions of Broward county.

City Gas is engaged in a multi-million dollar conversion project—installing underground distribution systems and pressure stations and adapting customers' appliances to natural gas.

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Minneapolis asks new franchise plans

The Suburban Gas Agency in Minneapolis has recommended that the 28 suburbs served by Minneapolis Gas Co. accept the firm's latest proposed franchise.

Under the franchise document, suburban communities would form a "suburban rate authority." This authority would negotiate with the company on behalf of all of them. State legislative action would be required to permit the municipalities to delegate rate-making to a common representative.

The proposed authority would be empowered to change rates if the gas company's proposals were not acceptable. Then Minneapolis Gas could challenge the change in the courts.

Under other provisions, the gas company couldn't include new areas under the franchise unless the authority agreed.

Gas vs. electricity compared by SGA

"Comfort . . . in Whole House Heating" is a manual published by Southern Gas Association to answer questions posed by gas vs. electric heating.

The manual can be used to inform gas company personnel, heating dealers, and heating equipment salesmen about the factual story of heating with electricity and how it compares with gas "fresh air" heating. As a consumer piece, it can be left with prospects for review and future reference.

Prepared under the direction of SGA's heating and air conditioning committee, the four-color, 16-page manual presents its comparison of the two homeheating methods in layman's language.

Copies are available from SGA for $1.50 each. Price information on quantity orders is available. Write SGA at 1524 Life Bldg., Dallas 2.

Fuel study launched

West Virginia's natural gas and oil code will be studied by a new governor's commission. The nine-member body was asked to examine present laws and make recommendations to bring oil and gas statutes up to date in keeping with modern practice.

complete Lancaster
main movement
assembly
FASTER INSTALLATION
LONGER LIFE IN METER
GREATER METER ACCURACY
Every quality part in this improved Lancaster Complete Main Movement Assembly with new hex is designed to make it easier to install for proper centering and easier adjustment for correct balanced stroke. Saves time . . . assures real accuracy . . . keeps meters in service longer. Upper and Lower Main Movements, Valve Cranks are available separately— or order entire Assembly ready to install.
* New Hex Speeds Tightening
For 1-A and #240 Gas Meters

IMPROVED Lancaster COMPLETE INDEX DRIVE ASSEMBLY

New hex saves time and trouble in installing. Adjustable worm axle dog simplifies correct positioning. Quality made for lifetime service once it is installed.

Lancaster
METER PARTS CO.
Manufacturers of Quality Parts for Gas Meters
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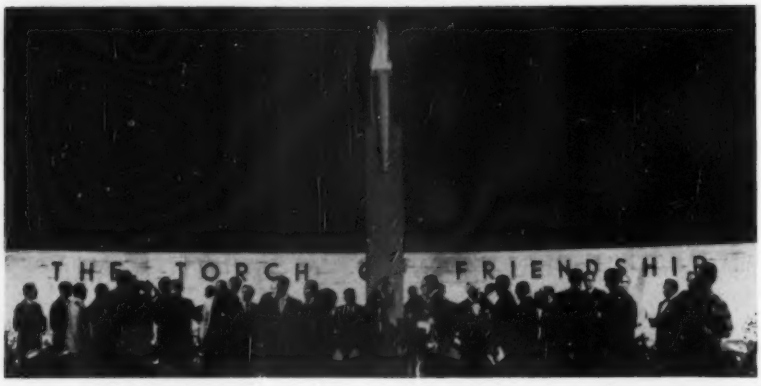
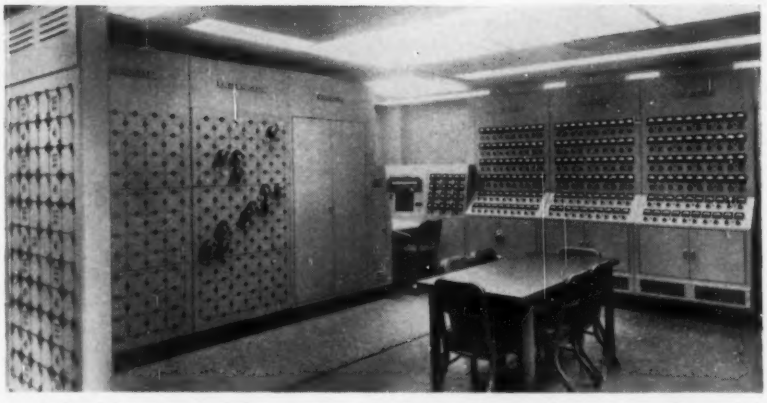
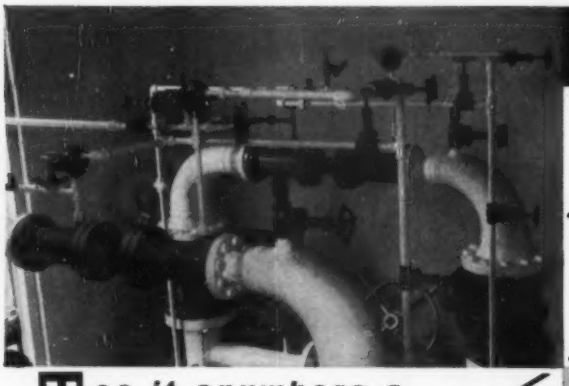


The "Torch of Friendship," symbol of good will towards Latin American countries, was dedicated recently in Miami, Fla. Flanking the 30-ft gas-fired torch is a display of the flags of the 21 nations of the Americas. The Houston Corp. piped natural gas to the torch, which will burn 24 hours a day, 365 days a year.

Construction and installation of this newly designed McIlroy fluid network analyzer at Western New England College, Springfield, Mass. has been completed. Standard Electric Time Co.'s analyzer will be used jointly by the college and the company to train students in the theory and operation of analog computers and for demonstrations. It is also available to utility and consulting engineers on a time-rental basis.





new!

REYNOLDS SLIDE VALVE REGULATOR

Use it anywhere a gas valve is needed!

An excellent control valve for town border, industrial, monitor and relief valve application for Psi to Psi gas regulation . . . Also as on-off control for process gas safety.

Compact cylindrical shape makes the new Reynolds Slide Valve Regulator easy to install horizontally or vertically, below or above ground.

Sizes, 2", 4", 8", others planned. Range: Max. inlet pressure 1,200 Psi.

Above: Reynolds Slide Valves reduce pipeline gas pressure for a Muncie, Ind., industrial system.

Parts are made of hard chrome-faced steel to protect against corrosion and wear. Simply remove one retaining ring to disassemble.

GEM

REYNOLDS GAS REGULATOR CO., INC., ANDERSON, INDIANA

ARKLA

A SUBSIDIARY OF ARKANSAS LOUISIANA GAS COMPANY

IGT expands board of trustees

The Institute of Gas Technology has increased membership of its board of trustees from 28 to 40.

Twelve men were elected to the board. They are:

One-year terms: William G. Hamilton, president, American Meter Co.; Paul Kayser, chairman, El Paso Natural Gas Co.; W. E. Mueller, president, Colorado Interstate Gas Co.; and G. J. Tankersley, president, Western Kentucky Gas Co.

Two-year terms: J. H. Campbell, president, Consumers Power Co.; H. D. Clay, president, Iroquois Gas Corp.; Dale B. Otto, president, New Jersey Natural Gas Co.; Peter J. Rempe, president, Stone & Webster Service Corp.

Three-year terms: William J. Harvey, vice president, Public Service Electric & Gas Co.; Robert W. Otto, chairman, Laclede Gas Co.; C. Pratt Rather, president, Southern Natural Gas Co.; and E. H. Smoker, president, United Gas Improvement Co.

Filling vacancies on the board are Robert I. Wishnick, chairman, Witco Chemical Co., for a one-year term; Donald S. Bittinger, president, Washington Gas Light Co.; and Remick McDowell, president, Peoples Gas Light & Coke Co., both three-year terms.

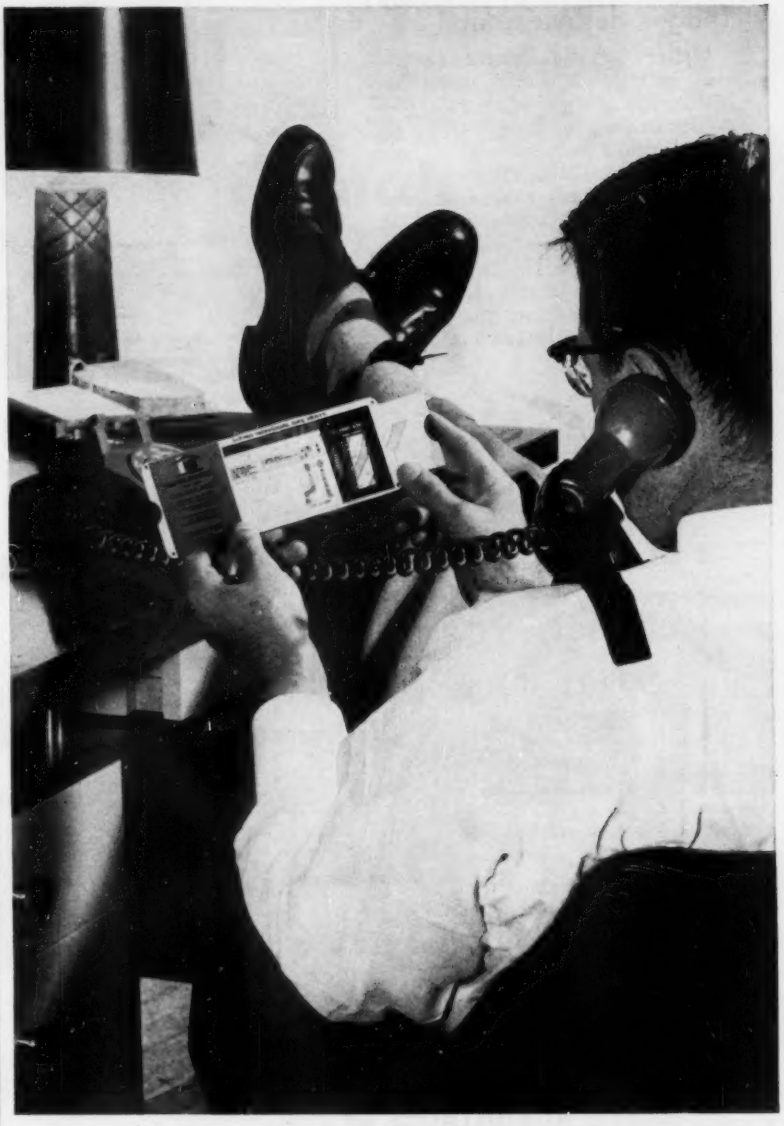
'Campaign calendar' maps promotion plans

Under AGA's year-long sales promotion program for 1961, every month is "M" month for a different gas appliance.

Published in standard flip-leaf monthly calendar form, the campaign calendar is designed to aid gas utilities, dealers and manufacturers by outlining gas industry promotions a year in advance, month by month, and day by day.

Briefly, here is how it stacks up:

January—gas dryers; February—water heaters; March—house-heating; April—Gold Star ranges; May—air conditioning; June—gas lights; July—refrigerators; August—gas incinerators; September—Gold Star ranges again; October—Blue-Star homes, New Freedom kitchens and Laundries, and industrial and commercial gas sales; November—home service and educational service; December—annual holiday appliance push.



You can tell a Metalbestos Man

by the Slide Rule he works with

That handy "slide rule" you see is actually a brand new service tool, the **Metalbestos Gas Vent Calculator.** With it, heating contractors can now accurately answer the most complicated venting questions in a matter of seconds. Think of the time it can save you on service calls, especially when troubleshooting gas heating problems. Then ask the nearest Metalbestos man where you can get your Gas Vent Calculator. No charge.

See your local Metalbestos representative or write Dept. P-1

AVAILABLE ONLY FROM METALBESTOS • Gas Vent Calculator • Reader's Digest Reprints • Color Slide Film "Heat in Harness" • Venting Schools • Vent Installation Handbook • Gas Vent Service Bulletins • Safety System Seals • Sales & Technical Literature • Ad & Article Reprints • Direct Mail Materials.

METALBESTOS DIVISION
WILLIAM WALLACE COMPANY
BELMONT, CALIFORNIA

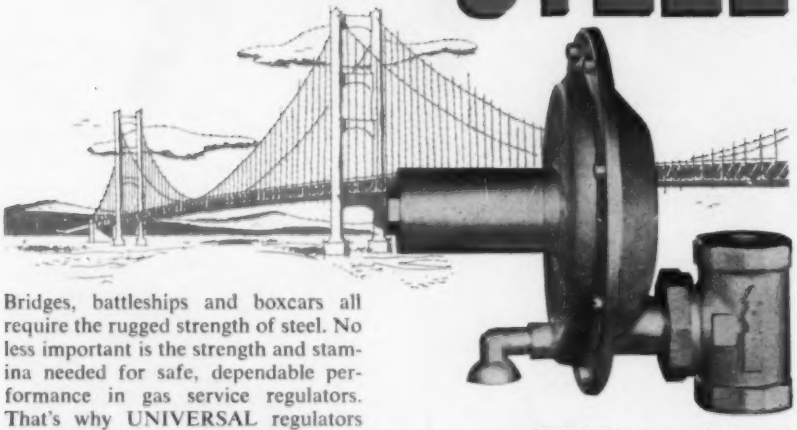
MANUFACTURING PLANTS IN BELMONT, CALIFORNIA • LOGAN, OHIO

Teague designs exhibit

Walter Dorwin Teague Associates, public buildings architects, will design the gas industry's $5.5 million exhibit for the 1964-65 New York World's Fair.

Andrews & Clark, structural engineers, will have charge of construction of the gas exhibit. It will occupy about three-fifths of the 50,000 sq ft leased by the gas industry at the Fair site. Landscaping of the exhibit groups will be done by Clarke & Rapuano.

the strength of **STEEL**



Bridges, battleships and boxcars all require the rugged strength of steel. No less important is the strength and stamina needed for safe, dependable performance in gas service regulators. That's why UNIVERSAL regulators are made exclusively of steel. They are shock resistant, lighter in weight and thoroughly dependable.

UNIVERSAL regulators for conversion or pressure elevation are available in one packaged unit with breather vent and cathodic insulator. Write for Bulletin No. 521 for complete information.

***Exclusive* ADVANTAGES OF**

UNIVERSAL GAS SERVICE REGULATORS

- ★ The original vertical diaphragm prevents water accumulation . . . no freezing, no internal parts rusting.
- ★ Every regulator "operation tested" at factory and set at desired outlet pressure.
- ★ Vital internal parts are made of bronze, stainless steel and aluminum for best corrosion resistance.
- ★ Once installed, regulators cannot be rotated to allow water, dust or other foreign particles to accumulate and disrupt service.
- ★ Engineering design and construction afford many exclusive maintenance and service advantages.

UNIVERSAL CONTROLS
CORPORATION
OFFICE AND PLANT — CARROLLTON, TEXAS
Mail Address — P. O. Box 13122 • Dallas 20, Texas

Gas at the fair

Lone Star Gas Co. played an important role in the 1960 Diamond Jubilee State Fair of Texas at Dallas. Two gas kitchens —the Italian Fortnights and the Blue Star (below) — plus an educational exhibit (above) telling the story of gas from wellhead to burner tip; a display of free-standing and built-in ranges; and RCA-Whirlpool's Miracle gas kitchen were seen by several hundred thousand fair-goers. Featured in the educational exhibit were a radio-playing thermoelectric generator powered by a gas light, an Italian-made gas flameless heater, and radiant heaters that may comfortably warm tomorrow's football stadium on the coldest day.

Vent bulletin published

The second in a series of bulletins dealing with safe, modern methods of gas vent installation has been produced by the Gas Vent Institute.

Bulletin 2 covers the advantages of Type B double wall metal vents.

Technical services information or copies of the bulletin are available from the Gas Vent Institute, 333 N. Michigan Ave., Chicago 1.

NYC's gas boxes must have flues

Under preparation is an amendment to New York City's Health Code to require that all gas refrigerators be connected to a flue leading to the open air.

Dr. Leona Baumgartner, city health commissioner, said the amendment also would require the reporting of all gas refrigerators in use or sold in the city.

Action was taken after the death by carbon monoxide poisoning of a family of four in Manhattan. Investigators found a defective gas refrigerator in the family's one-room apartment. Fourteen other gas refrigerators in the same building were found to be defective, the commissioner said. Dr. Baumgartner added that five were producing enough carbon monoxide to cause death.

The City Board of Health adopted the new requirement "in principle" and was expected to vote it into existence in December.

Before final action is taken on the regulation, however, real estate firms, gas companies, plumbers and manufacturers of gas refrigerators were asked for comment.

For the last decade, New York's City Health department has been waging an educational fight against the hazards of misused and defective gas appliances. The influx into the city of non-English speaking persons, however, has made it increasingly difficult, the department said, to reach some segments of the population.

Iroquois acquires Penn-York Natural

FPC said Iroquois Gas Corp. can acquire and operate facilities of its affiliate, Penn-York Natural Gas Corp. Both companies headquarter in Buffalo, N. Y., and are wholly owned subsidiaries of National Fuel Gas Co.

Penn-York operates about 53 miles of 10-in. transmission line, 74 miles of 8-in., and related facilities. They are located in Chautauqua, Cattaraugus, Wyoming, Allegany, Steuben and Erie counties, N. Y. Penn-York's only customer is Iroquois, for whom it transports gas under a cost-of-service tariff.

Continued on page 88

Have You Tried a RIDGID Hex Wrench Yet?

the Perfect Mate for your RIDGID Pipe Wrench!

Six Sizes with Maximum Jaw Openings of 1 1/16", 1 1/2", 1 3/4", 2 1/2", 3 1/2" and 4 7/8" across flats.

Finest of All Adjustable Smooth-Jaw Wrenches

MORE GRIPPING POWER... for all nuts. Puts a wrap-around grip on hexes that just won't slip. Because you're pulling with at least three flat sides at once, you'll never round off shoulders. Works on square nuts, valve packing nuts, unions and gas cocks and flat shapes, too. Smooth jaws won't even mar polished or plated surfaces.

RUGGED CONSTRUCTION... built good and solid. Thin but extra-strong jaws slip into tight places. The first time you use a hex wrench you'll know that here's a wrench you'll use for a long, long time. It's every bit as rugged as your familiar RIDGID Pipe Wrench.

No. E-110 Offset Hex Wrench
Big Jaw, Short Handle for Sink and Tub Drain Nuts—Maximum Jaw Opening—2 5/8" across flats

No. E-11 End Hex Wrench
Offset Jaw for Easy Work in Tight Places
Maximum Jaw Opening—1 1/2" across flats.

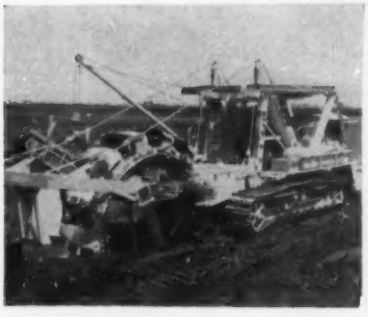
From experience you know it's easier to work with the best of tools. Order your RIDGID Hex Wrenches from your Supply House today!

RIDGID®
The Ridge Tool Company, Elyria, Ohio, U.S.A.

GAS DIGEST

New Products and Trade Literature

For more data on any of these items use the Readers' Service Card on pages 85, 86



1. Wheel ditcher

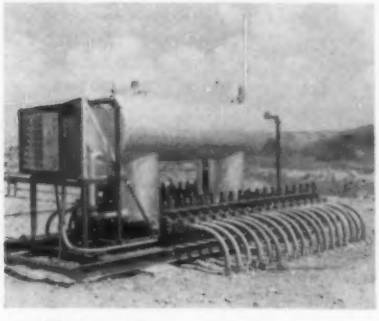
What is said to be the world's largest and most powerful full-crawler wheel ditcher comes from Barber-Greene (GEC-210). Model 777 is designed for heavy-duty, cross country work; digs 54 in. wide and 8 ft 6 in. deep. Trench width at top may be increased to 9 ft or more by using slopers.
Barber-Greene Co.

3. Microwave system

G-E's new business microwave system is designed to operate in the 12 kmc frequency band (GEC-140). The system accommodates up to 240 private trunk lines for voice, teletype or data messages. These are transmitted in a frequency band 500 mc wide between 12,200 and 12,700 gigacycles.
General Electric

5. Bump Cap

Lightweight head protection has been introduced by E. D. Bullard (GEC-121). The Bullard Bump Cap is ideal for workers in close quarters, such as overhead assembly lines, crowded engine and pump rooms. Made of an impact-resistant plastic material that won't crack, dent or shatter.
E. D. Bullard Co.



2. Test unit

Using pneumatic operating Mani-Flo valves, National's packaged well test unit automatically diverts fluid streams from wells, then separates, measures and records production (GEC-300). A strip chart recorder indicates if well is flowing or surging, best production hours, proper operation of pumping well, etc.
National Tank Co.

4. Backhoe attachment

Parsons-Shawnee 88C Hydro-Clam is a new backhoe attachment for utility tractors designed specifically for spot excavations (GEC-210). The new attachment is available with 24-, 30- and 36-in. wide buckets, features 10,000-lb breakout, 3000-lb lifting capacity, 12-ft digging depth, and 9-ft, 9-in. dumping height.
Parsons Co.

6. Oven

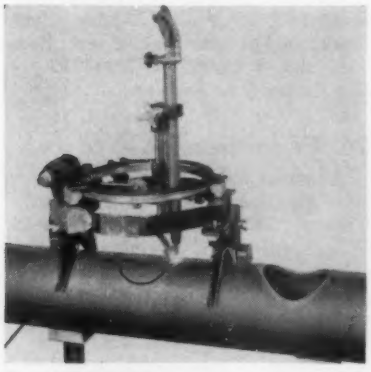
In Keating's Wimco oven, air is made turbulent with a velocity of 55 mph (GEC-230). Wimco is a coined word identifying the oven. "W" stands for whirlwind, "I" for isothermic, "M" for muffled, "C" for convection, and "O" for oven. Mass of moving air makes oven temperature completely uniform at any instant.
Keating of Chicago

7. Pipe guides

Tube Turns has a full size range of pipe guides for aligning and supporting piping which uses bellows expansion joints and expansion compensators (GEC-650). Guides consist of a guide spider to be clamped around the pipe and a guide casing, which can be bolted to base or other supporting structures at any angle.
Tube Turns Div.

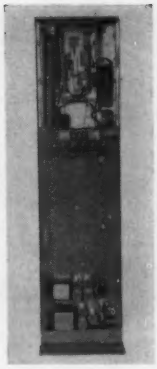
8. Composite anodes

A new form of anode from Electro Rust-Proofing is for cathodic protection systems using impressed current (GEC-110). The anode, PTC-Clad, is a composite conductor. Its wire form and combination of electrochemical properties make it possible to use platinum for anodes which formerly would have been impractical.
Electro Rust-Proofing Co.



9. Hole cutter

Steffan's Model ST hole cutter cuts 90 deg. holes in pipe, tanks and flat plate (GEC-650). Three sizes permit cutting perpendicular holes up to 18 in. in diameter without clamps, patterns or layouts. It can be used with electric drive or may be hand-operated in the field.
Steffan Mfg. Corp.



10. Receiver-transmitter

Motorola's new 12,000-mc microwave receiver-transmitter provides broad-band communications (GEC-140). The RF equipment, Model MR-40, is particularly suited for very high speed data transfer as well as transmission of conventional telephone and teletypewriter messages.
Motorola Inc.

11. Temperature transmitter

Taylor Instrument has introduced a gas-actuated temperature transmitter to complement the Sensaire 202T mercury-actuated version (GEC-750). Measurements as low as –400 deg F may be made with 1 per cent accuracy. The force-balance instrument is available with standard range spans of 100 deg F, 200 deg F, and 400 deg F.
Taylor Instrument

12. Remote readout

When a flame failure or other fault occurs in multi-burner gas-operated heating systems, a remote readout device provides instant numerical indication of exact burner position (GEC-750). The Telefier eliminates time-consuming checkout of each burner and other trouble-shooting operations.
Protection Controls Inc.

POKER?
Play to win!

How would you play these hands?

In coming months we'll discuss how most "experts" (steady winners) would play the above hands in draw poker, jacks or better to open, 6 or 7 players in the game.

Every hand involves some basic principle of good poker playing. Simple rules, but ones which are most often violated by most good losers. Of course, following the rules is no guarantee you'll win. But, you should win more often.

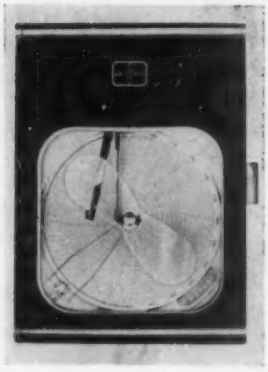
Ford is not recommending that you gamble. But if you do play poker for money, chalk or marbles... or for that matter, just for the fun of it, you'll probably enjoy the game even more when winning.

In the same series, we'll be telling you of another way to win with Ford, and with no gamble at all: simply by using Ford tractors and equipment to help solve the problems of your job.

Next month, for instance, we'll announce a cash-money offer which so far as we know has never before been made in this field. Watch for it. It could be worth more to you... well, maybe more... than a royal flush!

Tractor and Implement Div., Ford Motor Company, Birmingham, Michigan

Ford
TRACTORS
EQUIPMENT



13. Recorder-controller

Bristol is offering a single-case time-program recorder-controller in its Series 500 instrument line (GEC-750). Panel space requirements are cut 50 per cent. Because the recorder chart and program cam are independently driven, it is possible to record repetitions of the program on a single chart.
Bristol Co.

14. Plastic fittings

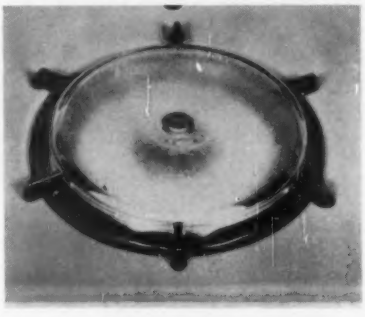
A limited size range of polypropylene plastic fittings for industrial piping is available from Tube Turns (GEC-630). Stocked initially are 2- and 4-in. pipe sizes in Schedule 40 and 80 wall thicknesses. Studies are being conducted of potential uses of the corrosion-resistant material in gas distribution lines.
Tube Turns Div.

15. Oxygen analyzer

A high sensitivity electrolytic oxygen analyzer is for continuous analysis of trace quantities of uncombined oxygen (GEC-670). It is based on a technique which insures quantitative reduction of oxygen, making Faraday's Law directly applicable over full-scale range of the instrument.
Lockwood & McLorie Inc.

16. Storage system

Remington Rand's new Univac Randex storage system stores a quarter billion digits and signs and makes them available within milliseconds (GEC-180). Each storage unit is comprised of two drums capable of containing 24 million digits and signs. The system can be expanded to as many as 10 storage drums.
Remington Rand Univac Div.



17. Top burner

Hardwick's Micro-Ray top burner emits a 3-micron infra-red ray, which scientifically represents the maximum heat output in the infra-red spectrum (GEC-240). The burner will operate at 60 per cent or greater efficiency for faster but cooler top-of-the-range cookery.
Hardwick Stove Co.

TRADE LITERATURE

18. Nodular cast iron

A technical dissertation on properties of nodular cast iron and its advantages as a material for control valve body construction has been prepared by Fisher Governor (GEC-450). Composed with an extensive bibliography, the paper treats the chemical and mechanical properties of nodular cast iron and its performance when subjected to high and low temperatures, corrosion, thermal shock and welding conditions.
Fisher Governor Co.

19. Catalysts

Girdler Catalysts' entire line of catalysts for gas processes, petroleum and chemical industries and other applications is described in a new catalog (GEC-300).
Girdler Catalysts

20. Infra-red burner

A new 4-page data sheet covers Bryant gas-fired infra-red burners (GEC-400). Included are performance curves, data on application, selection, and specification of units. The new burner was designed specifically for low-temperature industrial processing applications.
Bryant Industrial Products

21. Cast couplings

Permanent cast couplings for long-life pipelines are covered in a 12-page booklet published by Smith-Blair (GEC-370).
Smith-Blair Inc.

22. Regulators and valves

American Meter has published a trio of specification sheets covering six Reliance products (GEC-820). Catalog 136 describes Reliance type P pressure regulators; Bulletin 151 covers Series RV200 and 201 and DV 200 and 201 valves; and Bulletin 152 is devoted to Type PLV pressure limiting valves.
American Meter Co.

23. Manometers

Two sturdy Norwalk manometers built to take rough handling are described in Gas Consumers Service catalog sheets (GEC-540).
Gas Consumers Service

24. TV commercials

A series of television commercials has been prepared by Speedy Therm (GEC-550). In addition to a general-type commercial, the series covers gas dryers, gas heat, gas hot water, incinerators, air conditioning, and cooking.
Speedy Therm

25. Zero governor

Designed for maximum sensitivity at extremely low pressures, the Reliance Type AZ zero governor is described in Bulletin 114 (GEC-700). The AZ is recommended for gas engine installations, pre-mix machines, and other gas-air applications where zero pressure or vacuum opening is required.
American Meter Co.

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57	58	59	60	61	62	63	64	65	66	67	68	69	70

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GAS DIGEST

26. Gas Survey recorder

A gas survey recorder that dramatically cuts load research costs is covered in a 4-page catalog No. 35-1543 from Fischer & Porter (GEC-180). The catalog reviews the basis for scientific gas demand studies, and describes how survey costs can be minimized.
Fischer & Porter Co.

27. Gas turbine

Clark's new Model 305-S single shaft gas turbine for mechanical and generator drive is presented in Bulletin 186 (GEC-170). Important advantages such as simplicity, reliability, compactness and low first cost of this unit are discussed.
Clark Bros. Co.

28. Process control

The latest addition to its line of Microsen closed-loop process control instruments is described in Robertshaw's Aeronautical and Instrument Div.'s Bulletin 153 (GEC-750). Type A153 is a manual valve control equipped with a meter-type valve position indicator and a control knob.
Robertshaw-Fulton Controls Co.

29. Lubricating gun

A lightweight, portable, air-operated lubricating gun for large-scale valve lubrication is described in a 6-page bulletin from Rockwell (GEC-500). The gun is designed especially for field and plant maintenance valve users.
Rockwell Manufacturing Co.

30. Recorders-indicators

A 48-page ElectroniK recorder catalog highlights new modular design features (GEC-200). Catalog C-15-1a describes the quick-changing 2- to 24-point ElectroniK universal multipoint recorder.
Minneapolis-Honeywell

31. Protective coatings

The solution to a wide variety of corrosion and deterioration problems is presented in a new Koppers bulletin on Bitumastic cold-applied protective coatings (GEC-130). In addition to presenting properties and specifications, Bulletin T-97-61 lists typical installations requiring corrosion protection along with the recommended Bitumastic coating to assure lasting protection.
Koppers Co.

Problem

Remove oil and casing head drip ENTRAINMENT from 4" feed line.

Solution

Hi-eF GAS SCRUBBER To eliminate burner problems in stress relieving and normalizing furnaces. A Type L 4-150 Hi-eF Line Scrubber was installed in 4" feed line from storage well replacing baffle-type scrubber.

Results

Handling 1.5 MMSCFD of natural gas at 60 PSIG this unique two stage scrubber, with no moving parts, removed approximately 30 gals. of liquid entrainment per month.

More Information

Write for Bulletin 601 or ask for an Anderson engineer to call.

Hi-eF PURIFIER

By the Manufacturers of Super-Silvertop Steam Traps

THE V. D. ANDERSON COMPANY

Division of International Basic Economy Corporation

1981 W. 96th Street Cleveland 2, Ohio

Editors learn about western living

Editors from leading shelter publications learned all about the latest trends in western living from Pacific Coast Gas Association during a recent two-day conference in Los Angeles.

The conference was a project of the PCGA's sales and advertising section, chairmanned by D. E. Hosford of Northwest Natural Gas Co., Portland. R. M. McIntyre, Southern Counties Gas Co., Los Angeles, is vice chairman. SoCounties and Southern California Gas Co. acted as co-hosts.

Purpose of the conference was to show the editors just how people of the West live and to explain to them how this style of living has come about. Natural Gas has played a tremendously important part in the development of the western way of life.

One of the latest innovations in warm air heating systems is being tested at a drive-in theater in Detroit. A specially built concrete-block furnace room alongside the concession stand houses two large gas-fired furnaces which can produce enough heat to warm 70 average size homes. Michigan Consolidated Gas Co. ran a 750-ft gas service line to the furnaces. Warm air is pumped from the furnace room through two underground primary ducts, then through 36-in. lateral ducts for each row of cars. Through the use of flexible tubing and nozzles, warm air is run from the lateral lines to specially built posts at each car position. Nozzles from the posts to the cars supply the heat. Looking over the installation are Nick George, owner of the Jolly Roger Drive-in, and Russ Allen, of Durant & McAlpine, heating contractors.

MODERNIZED Extra Heavy Wall All-Malleable COUPLING Provides More Deflection Than Ever

Engineered in line with latest data on distribution pressures and installation ease. Inspect its construction and quality materials in detail. (Available with Normac INSULATING gaskets).

BRASS FITTINGS
IRON BODY COCKS
INSULATING GASKETS
SELF-LOCKING JOINTS
BELL JOINT CLAMPS
SERVICE TEES, ELLS
METER BARS
COUPLINGS

MALLEABLE SERVICE ELL
Maximum stab. All sizes, with or without insulating gaskets. Also in brass 1¼ I.P.S.

BRASS FITTINGS
The most complete line for copper or plastic tubing in ⅜, ⅞, 1⅛, 1⅜ O.D., 1¼ I.P.S.

Top Quality for 22 Years in Gas Distribution Equipment

Get helpful CATALOG 12. Photos, specs, detail drawings & much helpful data for modernizing or new installations.

PERMANENCY Rely on NORTON-McMURRAY for the finest! NORMAC continues to modernize and improve couplings and fittings in step with latest gas distribution demands. 22 years experience concentrated on ONE purpose . . . the BEST! Today, major gas distribution companies say "NORMAC" to define their standard of quality.

NORTON - McMURRAY Mfg. Co.
919 N. Michigan Ave • Chicago 11, Ill.

GAS DISTRIBUTION ENGINEERS

Engineers experienced in all phases of the engineering and installation of gas distribution systems for cities and towns, including feasibility studies, design, preparation of specifications, field location, and supervision of construction, inspection, testing, conversion and start-up. Openings for Project Manager and Project Engineers. Salary commensurate with experience. Send summary of experience and education.

Box 1615, GAS Magazine
198 S. Alvarado St., Los Angeles 57, Calif.

GAS • News Notes

The general committee of the Southwestern Gas Measurement Short Course has selected 89 class subjects and instructors for the 1961 session, slated for April 18-20. Sessions will be held at the University of Oklahoma in Norman.

Rockwell Manufacturing Co. has opened its newly expanded and modernized chemical engineering research laboratories in Pittsburgh.

One of New York City's largest distributing companies, S. J. O'Brien Companies, has been named distributor for Arkla Air Conditioning Corp.

Robertshaw-Fulton Controls Co. will build a two-story structure in Richmond, Va. to house its corporate headquarters.

A. M. Byers Co., Sharon, Pa., will market steel pipe on a national basis.

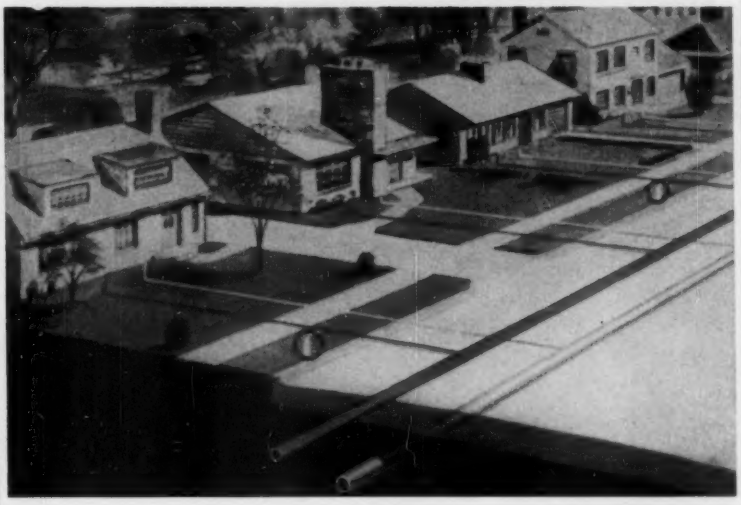
Helmerich & Payne Inc., Tulsa, has purchased Natural Gas Odorizing Inc., Houston.

Illinois' Commerce Commission has approved Northern Illinois Gas Co.'s request to lift all space heat restrictions on natural gas through 1961.

Long-suffering winter commuters will end their shivering on the wind-swept platforms of one of the world's busiest railway stations. Gas infra-red heaters are coming to their rescue. A battery of eight gas-fired radiant heating units is being installed over a 30-ft section of Long Island Railroad's station platform in Jamaica, N. Y. Brooklyn Union Gas engineers worked with the railroad in designing the test pattern for location of the heaters.

Laclede Gas Co.'s whimsical and hard-selling outdoor posters (see GAS, October 1960, p. 12) won two gold medals and two merit awards in the third annual Exposition of Advertising Art of the Art Director's Club of St. Louis.

Feb. 1 is deadline for receipt of entries in Public Utilities Advertising Association's 38th annual Better Copy Contest.



HOW TO STOP LEAKS IN GAS & WATER DISTRIBUTION SYSTEMS

The external corrosion of underground pipe is a major headache in many areas. It can cause leaks, necessitate repairs, and even create potentially dangerous conditions. Cathodic protection has proved to be a successful and economical way to stop such corrosion—on transmission and distribution pipelines, oil and gas well casing, etc.

Magnesium anodes or rectifier systems are used to project a protective current onto the line or other buried structure. For distribution systems, magnesium anodes are usually preferred for their low cost and to avoid harming other nearby structures.

CSI engineers are pioneers in this field. They offer expert consulting and installation services, plus a complete line of brand-name materials and equipment for both anode and rectifier installations—including Dow's new high-potential Galvomag anodes.

Call or write today for estimates or quotations. Prices are competitive and there is no obligation, of course.

CSI

Cleveland 13, Ohio
1309 Washington Ave.
Tel. CHerry 1-7795

CORROSION SERVICES INCORPORATED
General Office, Tulsa, Okla.
Mailing Address:
Box 787, Sand Springs, Okla.
Tel. Circle 5-1351

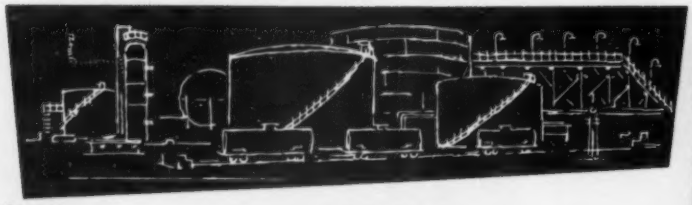
ANDERSON PIPE PULLER
— keeps a smooth bevel that makes welding easy

The gentle, yet completely firm grip that CAN'T jar loose, neither scars nor distorts welding end of pipe, assuring a smooth, tight-fitting joint. Instantly attached; instantly removed. Six years field usage in pulling through bores, dragging and hoisting has developed a *proved* record of time-saving.

FREE LITERATURE

ANDERSON & GRUNSKY
P. O. BOX 455, SANTA CRUZ, CALIFORNIA

Manufacturers of time-saving Anderson Test Plugs and Pipe and Tubing Pullers



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NEVER-DRY PEN
Writes for Months

AD NO. 103

REPLACES OTHER MAKES • USES REGULAR INKS

Regardless of pulsations or other causes of ink failures this Never-Dry Pen will make clean and complete records.

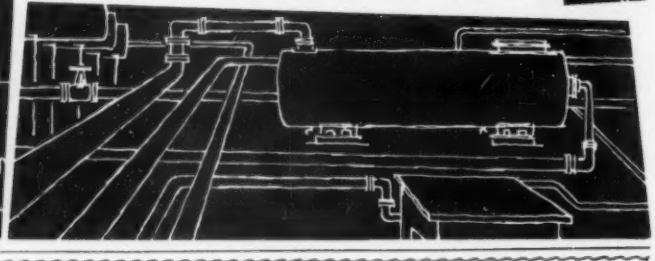
CHECK THESE EIGHT FEATURES

1. Always a continuous flow. No unrecorded records.
2. Holds sufficient ink for several months recording.
3. Constant weight for more accurate measurement.
4. Always clean, uniform records due to uniform flow.
5. No ink slopping or dripping in meter cases or on floor.
6. Uses regular recording inks or fast drying inks.
7. Stainless steel assures long and trouble-free service.
8. Used on practically any type of recording instrument.

Now made in 5 sizes. When ordering, specify make and type of recording instrument. Send for Bulletin 110-R3

ARCCO
INSTRUMENT COMPANY, INC.
7144 EAST CONDOR STREET · LOS ANGELES 22, CALIF.
MANUFACTURERS OF PRECISION INSTRUMENTS

$6.90 Each Net
Send for Quantity Prices



1897 1961

PIPE STOPPERS OF ALL KINDS

SAFETY GAS MAIN

STOPPER CO. INC.

GOODMAN
USED SINCE 1897
2" HANDLE & LOCKING SLEEVE
GAS MAIN STOPPER

523 Atlantic Avenue
Brooklyn 17, N. Y.
Cable Address GASTOPPER, N. Y.

GAS • PEOPLE

C. C. Eeles
Columbia

R. L. Wehrli
Robertshaw

C. C. EELES from manager of industrial sales for Ohio Fuel Gas Co. to director of business promotion for Columbia Gas System Service Corp. in New York.

ROBERT L. WEHRLI from vice president and general manager of Robertshaw-Fulton's Aeronautical & Instrument division to vice president and assistant to the president of the company, Thomas T. Arden.

W. W. SELZER from director of business promotion for the Columbia Gas System to vice president in charge of marketing for Western Kentucky Gas Co., Owensboro, Ky.

ROY R. BUSH from midwestern regional manager to a sales vice president of Rockwell Manufacturing Co.'s Meter & Valve division in Pittsburgh.

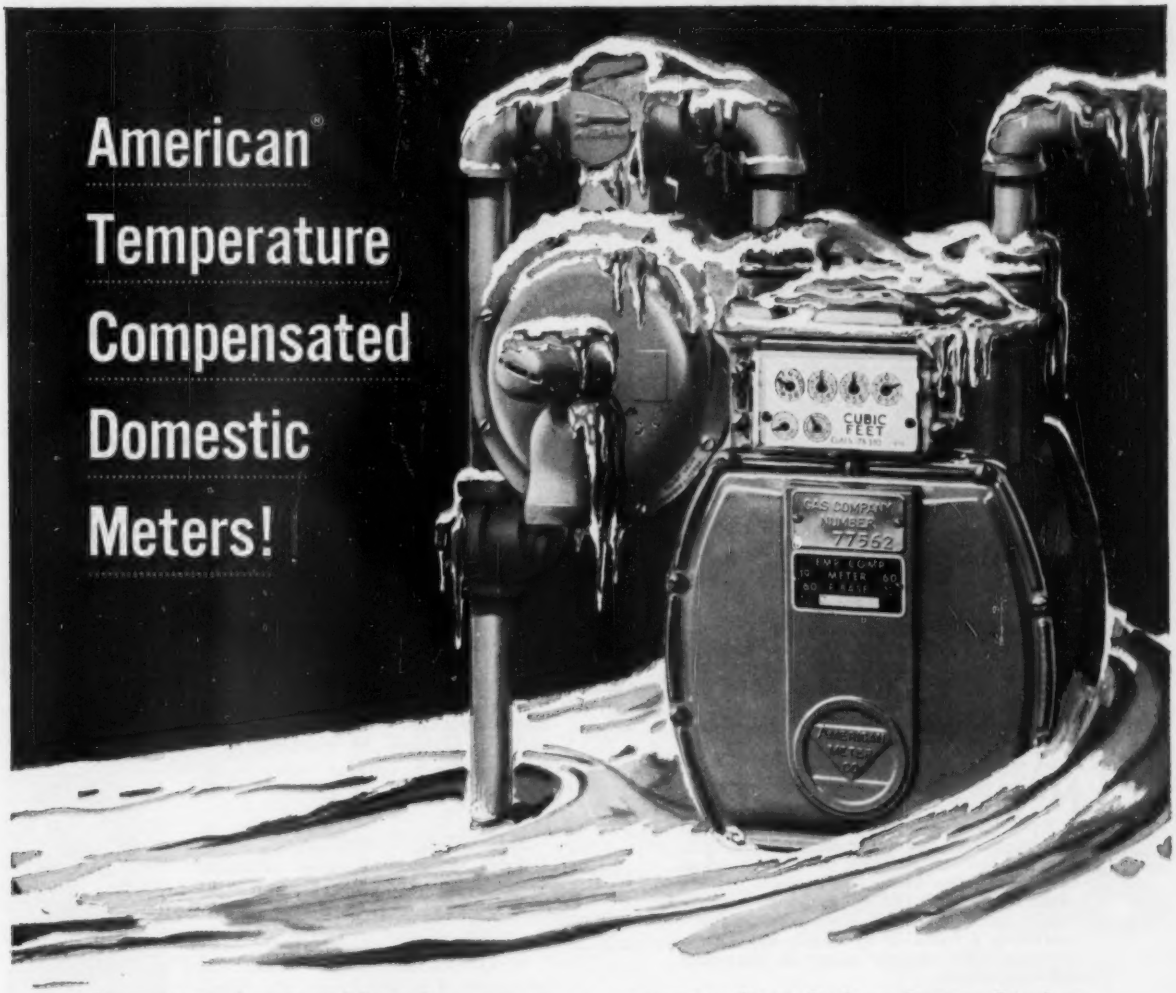
GEORGE W. FAIRBANKS from new business manager of Northern States Power Co.'s Red Wing division to manager of gas sales, headquartering in Eau Claire, Wis.

HOWARD H. WEILE from general services manager for Pacific Gas & Electric's Coast Valleys division in Salinas, Calif., to division manager.

W. W. Selzer
Western Ky.

Roy R. Bush
Rockwell

Now, from the pioneers in temperature compensation...



Once again, American Meter Company research has made a tremendous contribution to the technological progress of the entire Gas Industry. Like every other American Meter advance, the Temperature Compensating Domestic Meters are an outgrowth of the Company's continuous search for *better* ways to serve the industry's needs. In fact, nearly 30 years have passed since American Meter introduced the first temperature compensating device for large Positive Displacement Meters—the Base Volume Index.

The new Temperature Compensator is continuing proof that the Gas Industry can count on American to develop the most modern, accurate measurement equipment. American has pioneered in meter progress since 1836—and will continue to bring progress through research!

Write for full information.

AMERICAN METER CO. ESTD. 1836 MEASUREMENT ENGINEERS

AMERICAN® METER COMPANY

INCORPORATED (ESTABLISHED 1836)

GEM

GENERAL SALES OFFICE: Philadelphia 16, Penna. • Albany • Alhambra • Atlanta • Baltimore • Birmingham • Boston • Chicago • Dallas • Denver • Erie • Houston • Kansas City Los Angeles • Minneapolis • New York • Omaha • Pittsburgh • San Francisco • Seattle • Tulsa • Wynnewood

IN CANADA: Canadian Meter Company, Ltd., Milton, Ontario • Calgary • Edmonton • Montreal • Regina • Vancouver

SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase, and Welded Steelcase Meters • American-Westcott Orifice Meters • Instruments • Reliance Regulators • Apparatus • Valves

Quality pays in a TRENCHER

AUBURN

IS BETTER BUILT TO GIVE YOU

MORE PERFORMANCE

Every part of your **Auburn** trencher is precision designed and manufactured. You can depend on **Auburn** to deliver when others fail. The **Auburn** trencher is rugged and will dig up to 800 ft. per hour—trenching 6" to 14" wide and down to 6 ft. deep—featuring a variable hydraulic drive that automatically adjusts speed to changing soil conditions.

Time and performance are the basic ingredients of a profitable trenching operation. The **Auburn** Quality Trencher gives you both on *every* job.

AUBURN GEAR-DRAULIC
Tractor-mounted trenchers are available for M-F Work Bulls, IH Utility, John Deere Crawler and Wheel Industrial, and Ford Tractors.

Jeep-A-Trench GEAR-DRAULIC
the original Jeep-mounted trencher, and only trencher approved by Willys Motors. Available at Jeep Dealers.

AUBURN MACHINE WORKS, INC.
2055 South J Street, Auburn, Nebraska, U. S. A.
Phone BRidge 4-3141

Please send complete information and name of nearest dealer.

*Name*_____

*Address*_____

*City*_____ *State*_____

RAYMOND J. MEURER from American Broadcasting System to advertising and sales promotion manager of Michigan Consolidated Gas Co., Detroit.

SAMUEL W. HORSFIELD retired as vice president of Long Island Lighting Co. after 33 years of service.

K. ALBERT MIEGL from major development engineer to chief engineer of Arkla Air Conditioning Corp., Evansville, Ind., and ROBERT K. SPEAR from major development engineer to assistant to the vice president - engineering, research and development.

DEAN WILLIAM CAPLE, supervisor of the corporate department, to assistant secretary of Rochester (N. Y.) Gas & Electric Corp.

JAMES H. SELLS from district sales manager in Kansas City, Mo. to district manager in the Houston area for Rockwell Manufacturing Co.'s Meter & Valve division.

A. B. CHRISTENSEN from manager of service and education, agricultural division, to manager of J. I. Case Co.'s central services division in Racine, Wis.

MARVIN E. WHITE from central district industrial sales manager to manager of industrial sales for Ohio Fuel Gas Co., Columbus.

O. O. VAUGHT from production manager of Eagle Pencil Co., Danbury, Conn., to general manager of L. O. Koven & Brother Inc. and Koven Fabricators, Dover, N. J.

RICHARD W. CAMP from manager of the Oklahoma-Kansas division to vice president in charge of Arkansas Louisiana Gas Co.'s new Oklahoma-Kansas division.

J. K. BOAZ to sales manager, C. M. THOMPSON to residential sales supervisor, and G. S. KIMBALL to governmental sales supervisor—all at San Diego (Calif.) Gas & Electric Co.

FRED STEVENSON SR. named sales representative in the Southeast for Superior Meter division.

RUSSELL W. MCINTOSH joined Kralastic sales department of Naugatuck Chemical division, United States Rubber.

R. J. Meurer
Mich Con

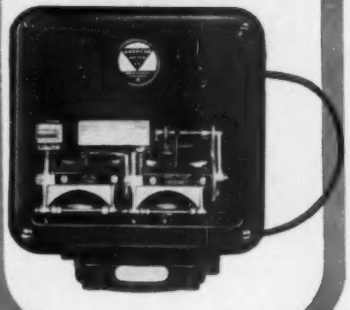
J. H. Sells
Rockwell

D. W. Caple
Rochester

R. W. McIntosh
Naugatuck

Accurate Flow Volumes at All Times

with an American® Base Volume Index



American Base Volume Indexes register the measured gas quantity at standard conditions of base pressure and base temperature on a direct reading counter. No computations... accurate gas volumes are shown continuously and immediately.

A second counter also indicates the gas volume at line conditions. Simple operating principle... integration is continuous with all functions performed mechanically through special gearing.

Write for Bulletin 200 for complete information.

AMERICAN METER CO. EST. 1836 MEASUREMENT ENGINEERS

AMERICAN® METER COMPANY

INCORPORATED (ESTABLISHED 1836)

General Offices: Philadelphia 16, Pa.
Sales Offices in Principal Cities

Spencer R. Milliken (left) has been named research director for Northern Illinois Gas Co., succeeding Earl L. Tornquist (seated), who plans to retire in April.

LLOYD L. GRACE from sales engineer in the northern Midwest area to Midwest regional manager, Davenport, Iowa, and CHARLES CHURCHILL from Western States Utilities and Central Natural Gas Co., to sales representative in Minnesota, Wisconsin, the Dakotas, and Montana for Sprague Meter Co., Bridgeport, Conn.

J. J. SHEEHAN from vice president-sales to vice president-advertising and promotion and J. Z. WATKINS from sales manager to general sales manager of Piedmont Natural Gas Co., Charlotte, N. C.

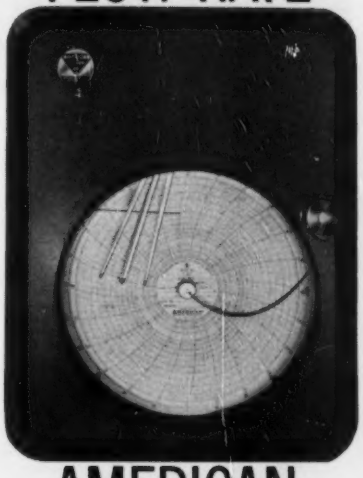
FRED R. CUPPETT to division superintendent for Manufacturers Light & Heat Co. at State Line, Pa.

JOHN P. VIGLINI to chief engineer for the transmission division of Lone Star Gas Co. and Lone Star Producing Co., Dallas, and A. B. HEMPHILL to assistant chief engineer.

C. Churchill
Sprague

Lloyd Grace
Sprague

PRECISION MEASUREMENT AT ANY FLOW RATE



AMERICAN-WESTCOTT A-88

ORIFICE METERS

Versatile American® Series A-88 mercury-type orifice meters meet the toughest flow measurement requirements – working pressures to 5,000 psi – interchangeable 10, 20, 50, 100 and 200-inch ranges. Recording meters may be equipped with 0-150° F. standard temperature element. Integrating meters integrate static and differential pressure, providing totalized flow indications. Telemetering equipped meters transmit integrated indications to remote locations.

- Manometer body easily cleaned – does not affect calibration.
- Tamper-proof calibration – simple, positive adjustment of float lever arm length.
- Interchangeable ranges – no manifold piping changes.
- Teflon-packed stuffing box is pressure tight, nearly frictionless, never needs lubrication.
- Teflon-packed pulsation dampener externally adjustable under full line pressure.
- Check valves give positive shut-off for over-range protection.

AMERICAN® METER COMPANY

INCORPORATED (ESTABLISHED 1836)

General Offices: Philadelphia 16, Pa.
Sales offices in principal cities

HAYS
Iron Body
Brass Plug
Gas Stops

for
METER SETTINGS
and
SERVICE LINES
Flat Head
•
With or Less Check Pin
•
Lock Wing

for
INDUSTRIAL USE
with Square Head

Also Available in
TAMPER PROOF
and
LUBRICATED PATTERNS

GENERAL PRODUCTS DIVISION
HAYS MFG. CO.
ERIE, PA.

D. L. Armstrong
Reynolds

A. J. MacKinnon
Reynolds

C. W. Watson
Philadelphia

RICHARD E. ROBB from industrial relations director of Honolulu Gas Co. to vice president; DAVID C. VAUGHAN from special assistant to the secretary-treasurer to assistant secretary; MAYNARD B. STANDLEY from sales manager of Cascade Natural Gas Corp., Walla Walla, Wash., to Honolulu residential sales supervisor; WILLIAM BONNER to Kauai branch manager; LESTER WEST to branch manager on Hawaii; and J. R. DETTON to specialized duties.

CHARLES W. WATSON from assistant to the president to vice president - general administration of Philadelphia (Pa.) Electric Co.

DONALD L. ARMSTRONG from chief draftsman to director of engineering activities and A. J. MACKINNON from Arkansas Louisiana Gas Co. to eastern area sales engineer, Reynolds Gas Regulator Co., Anderson, Ind.

DANIEL L. TURNER from visual education director to La Jolla district manager of San Diego (Calif.) Gas & Electric Co.

CHARLES J. SHERLOCK from gas engineer to superintendent of gas operations for Northern States Power Co.'s gas properties in Wisconsin.

for LEAKPROOF
PRESSURE-TITE
Connections...

TiteSeal®
SEALING COMPOUNDS

Heat and vibration-proof, non-solvent, will not shrink, crack or crumble. Makes all assemblies leak-proof and pressure-tight. Prevents rust, corrosion and joint seizure.

7 BASIC BLENDS

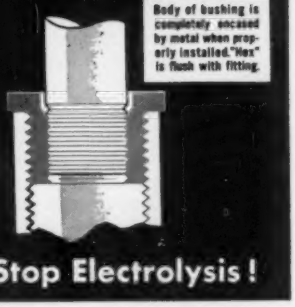
LIQUID WRENCH

LOOSENS
RUSTED BOLTS

A powerful blend of fast-acting solvents that literally "melt the rust away" —safe on all metals and alloys.

RADIATOR SPECIALTY CO.
CHARLOTTE, N. C.

MAYCO
NYLON
DIELECTRIC
BUSHINGS



Stop Electrolysis!

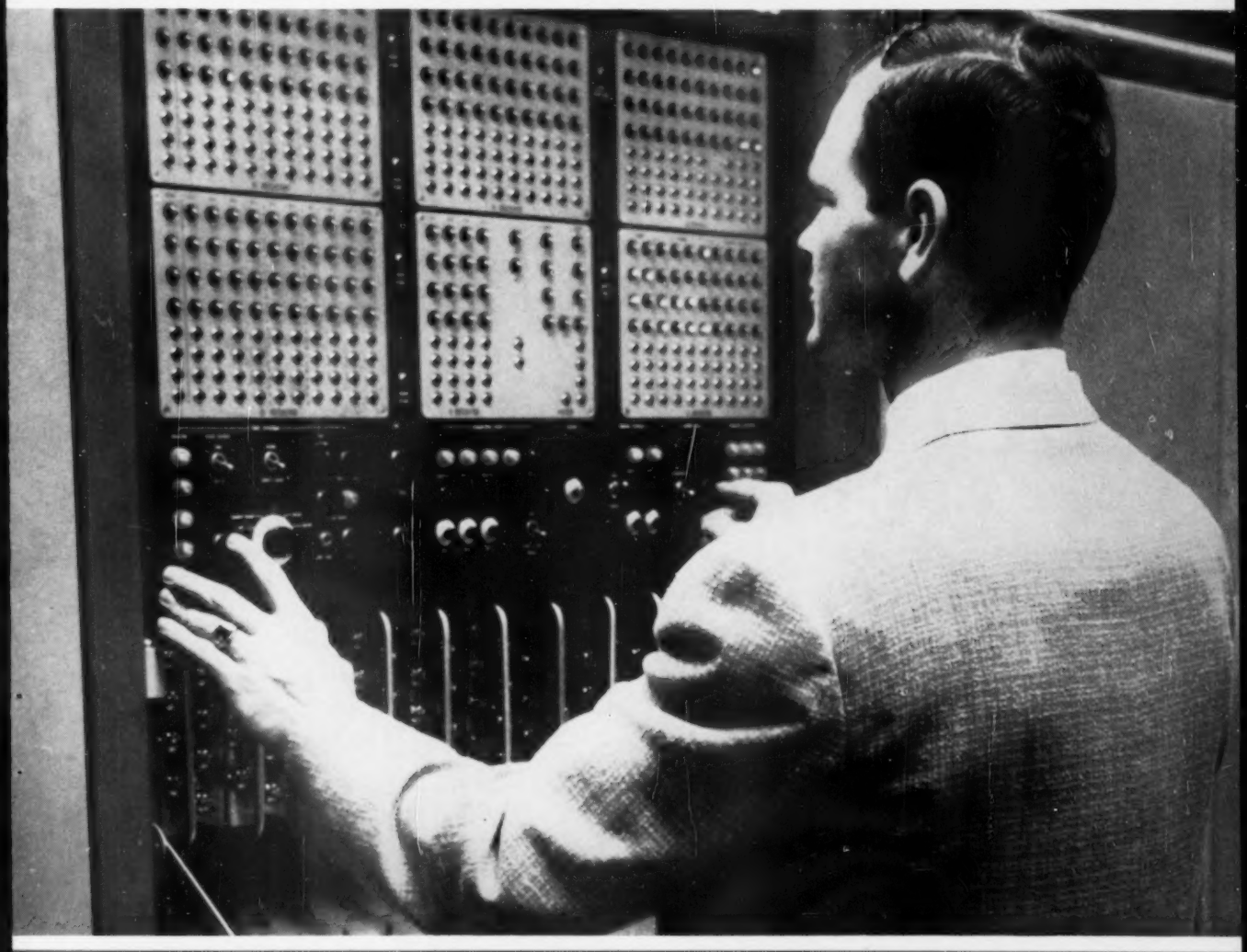
Sandwiched between two dissimilar metals, Mayco nylon dielectric bushings prevent metal to metal contact — stop *electrolytic* action! Able to withstand pressures in excess of 1000 lbs. and temperatures over 300°F, Mayco dielectric bushings gain added strength from clamping action of surrounding metal. Most sizes also available with extra-heavy "Hex" to facilitate use of ordinary wrench. Couplings and unions also available factory equipped with Mayco-bushings.

Order from your jobber or write:

MAY PRODUCTS, INC.
BOX 427, GALESBURG, ILLINOIS
Manufacturers of: MAYCO dielectric fittings and MAYCO water softeners

GAS

PIPELINE SECTION

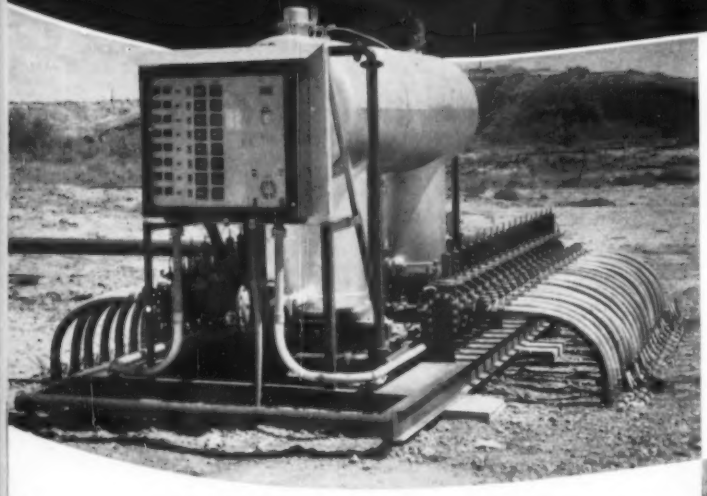


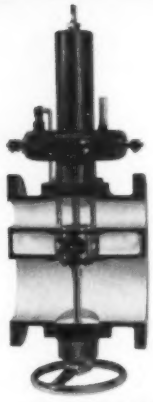
Paperwork simplification through integration of data processing

NATIONAL®

Packaged Well Test Unit

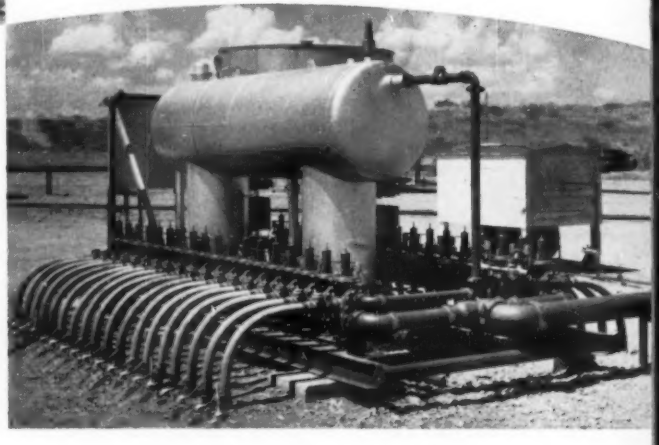
"Tests Better Automatically"





National MANI-FLO® Valves make this compact unit possible. MANI-FLO Valves require no lubrication and no expensive well-headers. When bolted together, MANI-FLOS are their own well-header and test line . . . self-contained . . . — Unique!

PATENT APPLIED FOR



AUTOMATICALLY DIVERTS FLUID STREAMS FROM WELLS, THEN SEPARATES, MEASURES, AND RECORDS QUANTITIES

- Automatically programs each of **36** wells in sequence for scheduled test.
- Separates oil, gas, and water.
- Measures the oil and water in the National Type B Liqua-Meters located in the legs of the National O-G-W MONOTUBE® SEPARATOR.
- Accumulates the volume of each product on the reset counters on the control panel.
- Strip Chart Recorder records production in relation to time.
- Separated products commingled and returned to the production line after test.
- Electric control panel actuates the pneumatic operated MANI-FLO valves to place well on test or production.
- Pictured unit does not measure or record gas production, but facility may be added at nominal cost on the same skid.
- Any power failure diverts all valves to production.
- Wells may be shut in manually with handwheel on bottom of MANI-FLO valve.

CONTROL PANEL
Weatherproofed and rain shielded. Clear plastic window allows complete visibility of all counters, well selector switches, and Strip Chart Recorder. Light indicates well on test.

STRIP CHART Recorder indicates:
Best production hours.
If well is flowing and/or surging.
Proper operation of pumping well.
Accurate well performance.

A Plus Value With All National Products . . . Engineers and field crews living in your area with stocked warehouses, complete units or parts ready to size, install and service National Well Test Units!

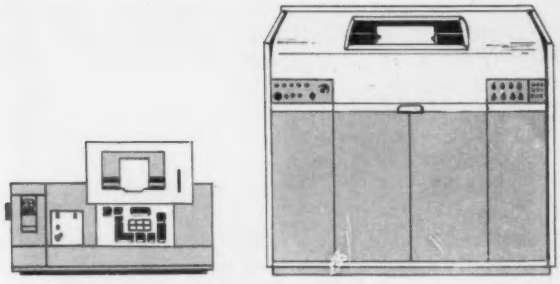
It's a National®

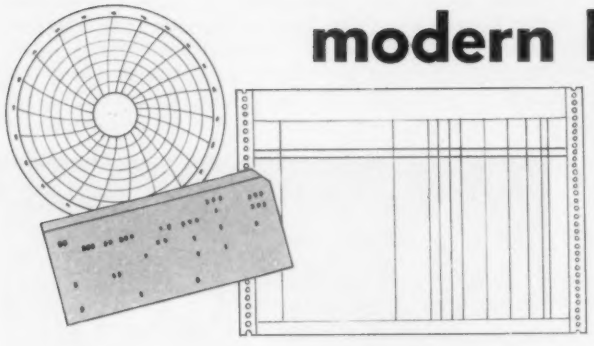
NATIONAL TANK COMPANY

DRAWER 1710

TULSA, OKLAHOMA

Computer + modern business forms = streamlined paperwork





By FRANCIS A. LANGENFELD, Director of Data Processing
Northern Natural Gas Co., Omaha

AN electronic digital computer and a series of well-designed business forms have streamlined and refined our necessarily complex paperwork to a degree we would have thought impossible a few years ago, under manual procedures.

Reports and documents ranging from meter chart computations, through accounting statements, checks, marketing statistics and engineering estimates are now produced faster and more accurately than ever before, yet with considerably less effort.

Clerical duplication and repetitious handling of papers have been either greatly reduced or entirely eliminated. The work of our clerical personnel has been upgraded considerably. There is much less drudgery such as detailed rechecking of figures.

Northern Natural Gas Co. is primarily a transmission company. Our principal market area includes Minnesota, Iowa, Nebraska, South Dakota and Kansas. We serve a population of 2,823,698 in 387 communities. Our Peoples Natural Gas Division retails gas to 110 of these communities. The rest are served by 35 utility customers.

We also have two subsidiaries. Northern Natural Gas Producing Co. is a gas and oil exploration and production firm. Permian Basin Pipeline Co., which operates in west Texas and New Mexico, purchases, gathers, processes, transmits, and sells natural gas to our firm.

The headquarters offices for these firms are in Omaha. Consequently, all benefit from our new data processing set-up. Our computer, installed in June, 1957, is a Dataron Model 205, manufactured by the Electrodata division of the Burroughs Corp. Forms used are marginally punched, Standard Register Kant-Slip continuous forms, which provide perfect register and excellent carbons, even through the seventh copy on our monthly gas delivery statement, for example.

The system which produces these multipart documents has been mechanized to the greatest degree possible, starting with gas flow computations. When meter charts come into the measurement department, they are integrated to translate the line reading into a numerical reading. The charts, with this reading on them, go to a card punch operator, who cuts a card for each chart.

We feed these cards into the computer and it calculates the volume in Mcf, daily or weekly, depending on the type of chart. It updates its own magnetic tape record of the particular meter, and punches a card for transfer posting the activity record information onto the back of the meter chart.

In addition, the computer produces our daily activity record of meter chart computation. This, like all our other computer reports, is printed on an IBM 407 accounting machine.

At the end of the month, we compute the monthly gas delivery statement. It lists delivered to, delivered for, location, date, base pressure, disc size, specific gravity, coefficient, daily volumes and total delivery in Mcf.

Copies of the statement are distributed to various departments and to interested parties on the outside.

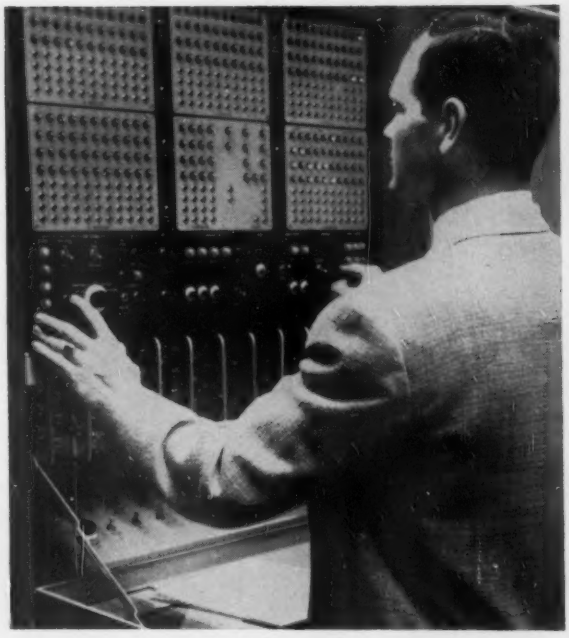
At the time we print this gas delivery statement, we also punch a monthly summary volume card. It is used to compute, via the Datatron, the royalty payment information. This is printed out on a two-part production accounting statement made up by well. It lists all owners, their numbers, the price of gas per Mcf, each owner's interest in the well, the gross amount per owner, and taxes per owner.

While this production accounting statement is being produced, the computer updates its statement information stored by well on a magnetic tape, and punches a card for each interest owner.

We also have a tape listing payees in numerical order. So, we sort these cards by payee and transfer the information from them to the computer. The com-

RIGHT: Meter charts are integrated to translate the line readings on them into numerical readings.

BELOW: This numerical reading for each chart is punched into a card which the computer can "read."



Operator at console adjusts the computer for the gas flow program. Cards punched from meter chart readings are then fed into it.

puter figures the net amount due each payee, updates the payee magnetic tape, and we print our continuous form royalty checks on the 407, itemizing volume, prices, taxes, etc., on the remittance statement. The check and statement are on Standard Register check stock. They make up the first part of a four-part form. It has Zipset stapling on the marginal perforations so it will remain a unit until we want to separate the various parts. These include copies for our treasury, accounting, and production departments.

In computing the checks, the computer automatically sorts out payees not due to be paid—those who receive checks quarterly or annually, for example. Cards for them, and previously punched cards for payees to whom checks have not yet been issued, are listed on a two-part cumulative amounts unpaid report which goes to our accounting department.

After the tape which produced the production accounting statement has been updated as described, we use it to produce a production accounting summary voucher, arranged by well name, contract number, field and state.

Our diverse operations require a wide variety of paperwork. By manual methods of the past, its production left something to be desired. For example, our gas statements were handled in this manner:

They went from the measurement department to gas accounting where a figure was copied from each statement onto a work sheet. A desk calculator operator then priced and extended them. Next, they went back to the accounting section where the extensions were entered on a voucher summary; then to an operator who posted a ledger card for each payee.

A typist then got the statements and produced a stencil master. As many copies were run from it as there were interests in the well.

These copies went to gas accounting where they were prepared for payment. If there were 20 names on the statement, a line was drawn under the first name on the first sheet, the second name on the second sheet, etc., and these sheets were stacked by payee. The stacks went back to the posting operator who wrote the checks on a posting machine and also posted to an offset (debit or balance).

The checks and statements went to accounting for checking, and to our treasury department for signing and mailing. From the ledger cards we then had to take a manual balance.

Now, however, our computer and the multipart forms it helps produce make this type of clerical shuttling of papers completely unnecessary. Manual and desk-type calculations have been replaced by electronics, and repetitious writing has been replaced by machine-printed carbon-interleaved forms.

In addition to accounting efficiency, the computer provides two marketing reports. One is a three-part off-peak requirements comparison which is derived from a tape updated monthly and arranged by consumer group, and utility. It lists the date of maximum volume for current year and previous year, a comparison percentage; the year-to-date total, previous year-to-date total and its comparison percentage. This is used for statistical analysis.

The second marketing report is a four-part off-peak consumer total daily volume report. It shows sales, curtailment ordered, requirements, curtailment not ordered, total curtailments, total requirements and the days of the month. This document, which lists volume summaries by group and subgroup, gives us the basis for figuring penalties and also supplies us with valuable sales information. A copy goes to the utility for its analysis.

Gas supply documents produced by the computer installation include a five-part state regulatory body report compiled from the monthly summary cards. It lists the producer or operator, lease name, well number, location, and production for the month in Mcf.

We also get a gas supply production summary report listing gas receipts by producer, by contract and daily average of the monthly flow. It compares the present month with the same month a year ago and compares the cumulative totals for the current year and the past year to date.

This is a management report which supplies us with at-a-glance information on whether we are keeping up with our contract demands. It is also valuable at hearings.

Computer (above) calculates volume in Mcf, daily or weekly, depending on type of chart, and prints out a daily activity record of meter chart computation on the accounting machine. Examining the record is chief program analyst Paul Bausch. In addition the computer updates its meter records stored on magnetic tape like this (below), and punches a card for transfer posting the activity record information onto the back of the meter chart.

The engineering department uses the computer in pipeline system design work to process calculations involving additions to the main system consisting of both large diameter lines and compressing facilities, branch line systems serving several hundred communities, cost estimates for pipeline additions and compressor station efficiency studies relative to installed cylinders, gas cleaners, cooling towers, etc.

The estimated cost to construct a pipeline addition is printed on an IBM 407 accounting machine showing the detail unit cost separately for material and installation. Also the average cost per mile is shown.

Actually, this is a 22-in. form in length with a perforation in the middle, showing material cost on one-half and installation costs on the other half, thus giving us two 8½-in. x 11-in. forms for each estimate. This form was adopted for ease of binding to match related documents.

Thus, we have a truly integrated system of data processing here at Northern Natural Gas. This is valuable to us not only because it increases the efficiency of today's operations, but also because our firm is a growing one in all respects.

Now we can look to the future with the knowledge that our modern computing equipment and the modern documents which flow through it will not only be able to handle this continuing growth, but, in a very real sense, are contributing to it. ■

New engines from old

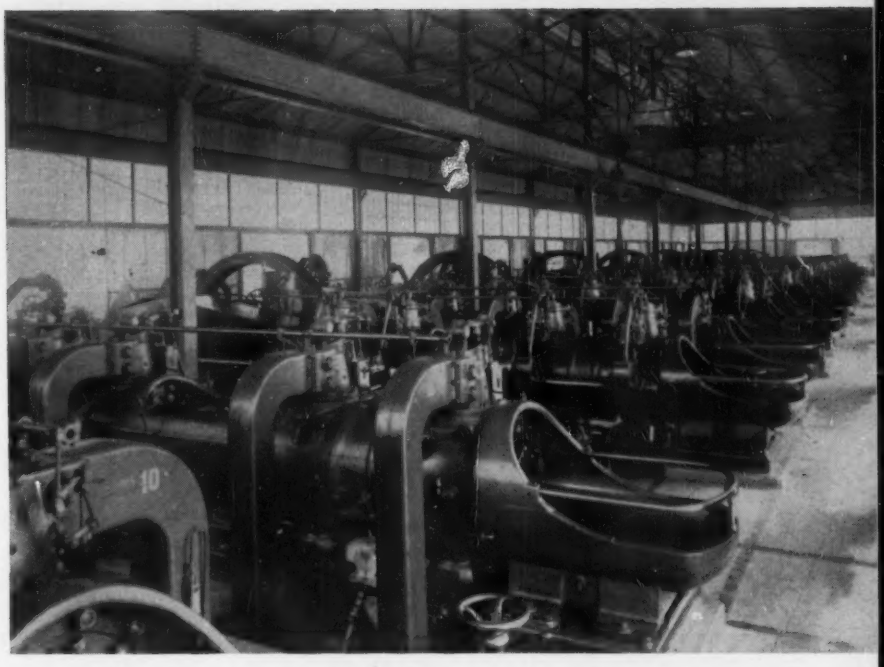


Fig. 1. Picture of compressor units taken in 1928.

By R. N. TALLEY, Superintendent of Compressor Stations
Pacific Lighting Gas Supply Co., Los Angeles

► *Faced with mounting maintenance costs and excessive downtime on its 30-year old compressor units, Pacific Lighting Gas Supply decided to embark upon an extensive reconditioning program. With seven of the 10 units overhauled, repairs and downtime have been reduced dramatically at a fraction of the cost of new horsepower.*

AT our Ventura compressor station we have 10 760-hp Cooper Type 19 compressor units which were originally installed in 1927 (see *Fig. 1*). After some 30 years of continuous operation, it became apparent that extensive repairs would be required if we were to continue operating these units without excessive downtime and maintenance costs.

Over the years we had to add to the maintenance crew and press the operating and supervisory personnel into service upon occasion. By 1954, overtime was averaging more than 10 man-hours per week. Emergency call-outs of mechanics were frequent. Since we were operating at near ultimate capacity on a year-around basis, an unscheduled shutdown meant blowing gas in the field. For the benefit of those who have not had the opportunity of dealing with field operators, I assure you this makes them quite unhappy.

In order to have standby capacity, we added, over a period of four years, six 660-hp angle-type units. Seizing upon this breathing spell before field production caught up with us, we decided to enter upon a program of rejuvenation of the old horizontal units.

An analysis of our repairs showed a recurrence of the following problems:

1. Ignition failure.
2. Broken power cylinder studs.
3. Corrosion leaks in power piston rods.
4. Oil pump failure.
5. Lubricator pump failure.

• Ignition failure

These units were equipped with battery-ignition systems. Each unit had a circuit-breaker with eight breaker points which had to be timed and adjusted individually. Maintenance of these required the attention of a mechanic practically full-time. Five or six sets of points had to be changed daily. In addition, arcing made these devices quite hazardous.

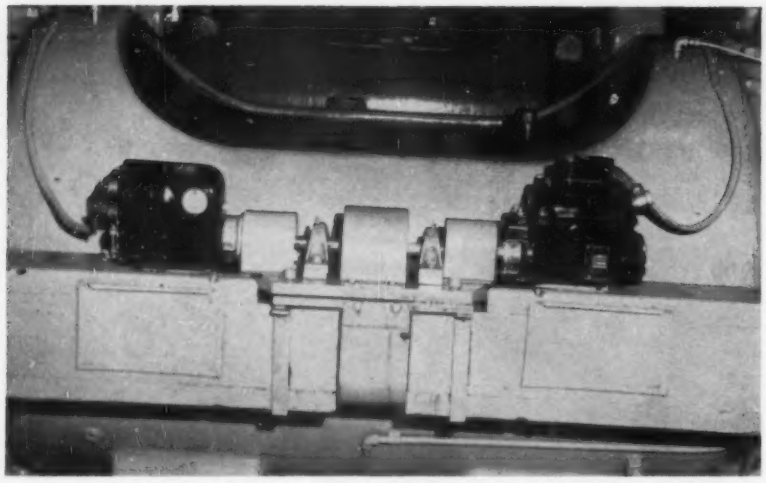


Fig. 2. Magnetos mounted on top of layshaft housing. Drive is by chain and sprockets from layshaft.

As an experiment, we installed four low-tension magnetos, together with coils and driving mechanism on one unit (see *Fig. 2*). Results were so gratifying that, after 18 months running time, we decided to equip the remaining units in the same manner. This has resulted in smoother running units, virtually no failures, and little maintenance except for annual inspection and greasing of magnetos.

• Broken power cylinder studs

The Cooper Type 19 compressor unit has four double-acting power cylinders mounted in tandem pairs. On each side the inner cylinder is bolted to the main frame, which houses the crankshaft and main crosshead guides. To the outboard end of the inner cylinder is bolted the intermediate crosshead guide or "distance piece." Then, in turn, are the outer cylinder and rear crosshead guide or "tailpiece." On the opposite side of the crankshaft, and bolted directly to the main frame, are the compressor cylinders. The distance piece and tailpiece, as well as the compressor cylinders, are mounted on pedestal feet held down by guides which permit longitudinal motion but restrict lateral motion.

We found that, over the long life of these units, the feet had worn down into the pads, allowing the tail-

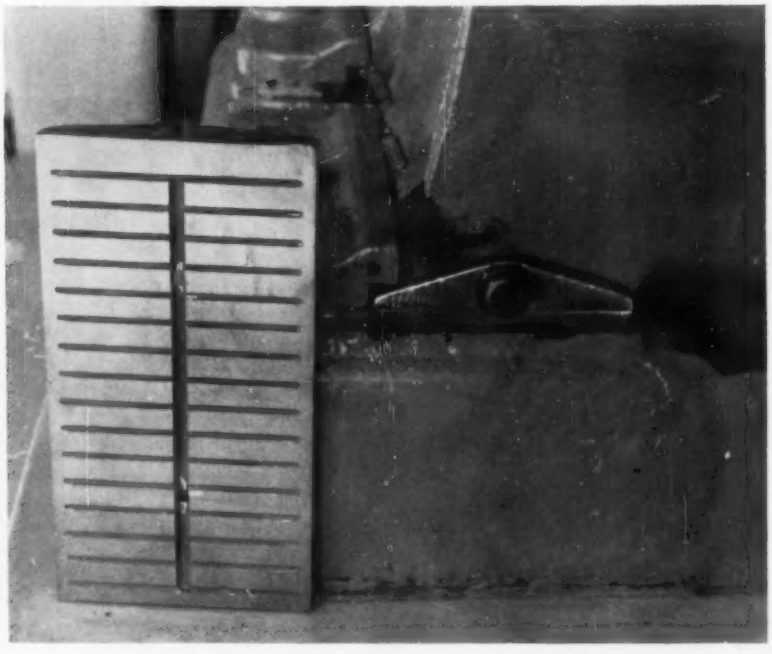


Fig. 3. Bronze anti-friction plates.

Fig. 4. Cracked main frame showing gusset brazed in place.

pieces to droop off as much as ½ in. In addition, the mating surfaces had become corrugated like a washboard, preventing free movement. Also, the mating flanges between the power cylinders and main frame had fretted off. Numerous cracks had occurred in the power cylinders at the stud holes. Nearly all the main frames were cracked at the bottom of the cylinder flanges. The foundations had become oil soaked and cracked. All of this caused considerable misalignment; and the stresses set up necessitated replacement of 30 to 40 broken studs per month.

Our solution to this problem was to remove completely the unit frames, chip out as much of the bases as was necessary to reach solid concrete, and repour. In some instances it was necessary to remove all the old concrete. While this was going on, we machined the pedestal feet and pads and installed bronze antifriction plates (*Fig. 3*); rebushed all the worn linkages; brazed in reinforcing gussets in the main frame (*Fig. 4*); repaired the flanges and cylinders by brazing and machining; rebored the worn cylinders; and installed new pistons, rings, and bearings as needed. To date, we have reconditioned seven units. Broken studs have been reduced to about one-tenth of the former number.

• Corrosion leaks in power rods

The power pistons and rods on these units are cooled by jacket water which enter through slip tubes into the intermediate crosshead and flows both ways, being discharged from the main crosshead and the rear crosshead. The rods are 5¼-in. OD with 1½-in. thick walls. Over the years we experienced very severe internal corrosion of the power rods, usually in the upper third sector in the packing area (see *Fig. 5*). Water leaks due to perforations were frequent. Some occurred only seven years after installation. You can appreciate our concern with this problem when you realize that we have 40 of these rods in service, each costing nearly $1300 to replace.

There have been numerous theories as to the cause of this phenomenon. The consensus seems to be that cavitation, caused by the formation and collapse of steam bubbles in the presence of entrained oxygen, is responsible. We tried various remedies, including inhibitors in the jacket water, increased water pres-

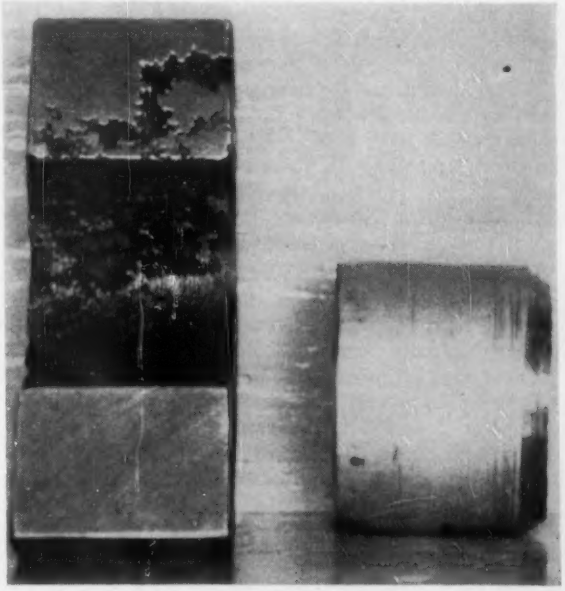


Fig. 5. Section of power rod showing corrosion. To the right is a short piece of stainless steel tubing.

Fig. 6. Power rod with stainless steel sleeve pressed in.

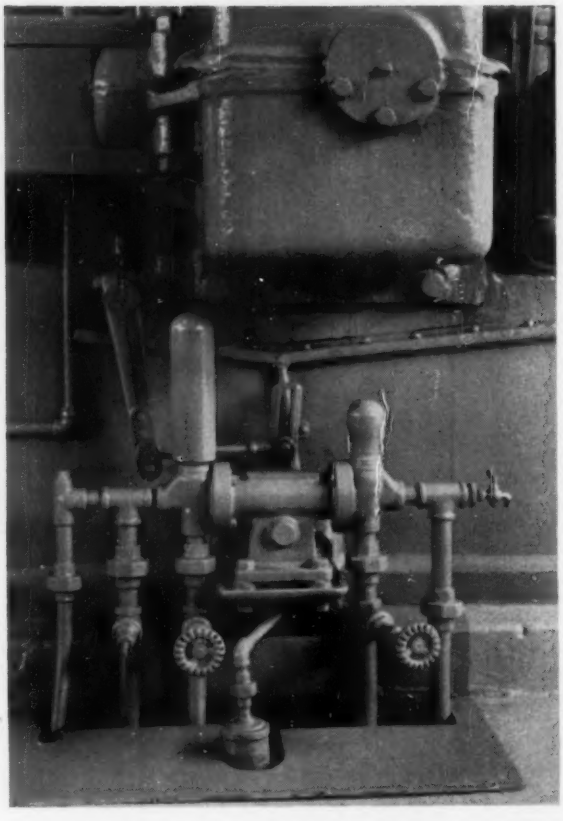


Fig. 7. Old plunger-type oil pump.

sure and volume, and restricted outlets without noticeable improvement.

We even made two rods of stainless steel. In addition to being terrifically expensive to make, these rods tend to twist and warp with temperature, causing misalignment of the crossheads. However, after several years of operation, absolutely no evidence of corrosion could be detected. This, together with the satisfactory results obtained from using stainless steel pipe and fittings on the end caps, caused us to consider lining our existing rods with stainless steel tubing.

After making an ultrasonic survey of all our power rods to ascertain which ones were in need of repair, we arranged with a local machine shop to bore out the rods and press in the tubing (see *Fig. 6*). We have not yet completed this program, but in the two years since the first rod was sleeved and put back in service we have experienced no leaks or evidence of corrosion on any of the rods so repaired.

• Oil pump failure

As originally equipped, these engines had two plunger-type oil pumps actuated by a rack and pinion driven by an eccentric on each end of the crankshaft (see *Fig. 7*). Frequent pump failures, with consequent bearing loss, occurred when the drive arms would break or the pump would lose prime. Care had to be taken to keep the linkage tight and in adjustment. Filtering, or rather straining, was achieved by letting the oil run through canvas bags suspended in the filter bag tank. Several years ago, after we had experienced recurrent cases of dermatitis from washing the filter bags with solvent, we added car-

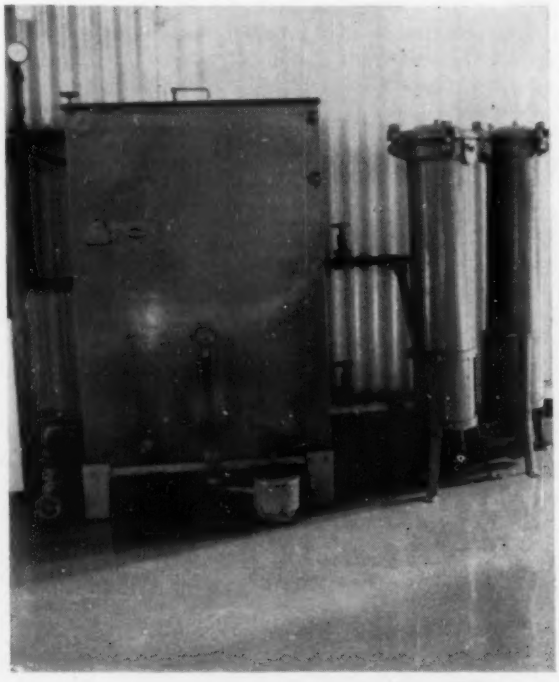
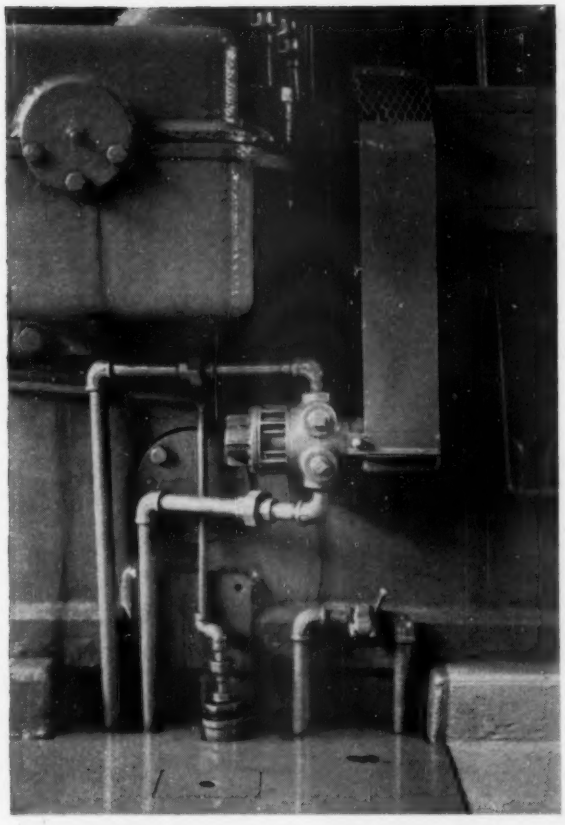


Fig. 8. Old filter bag tank and cartridge-type filters.



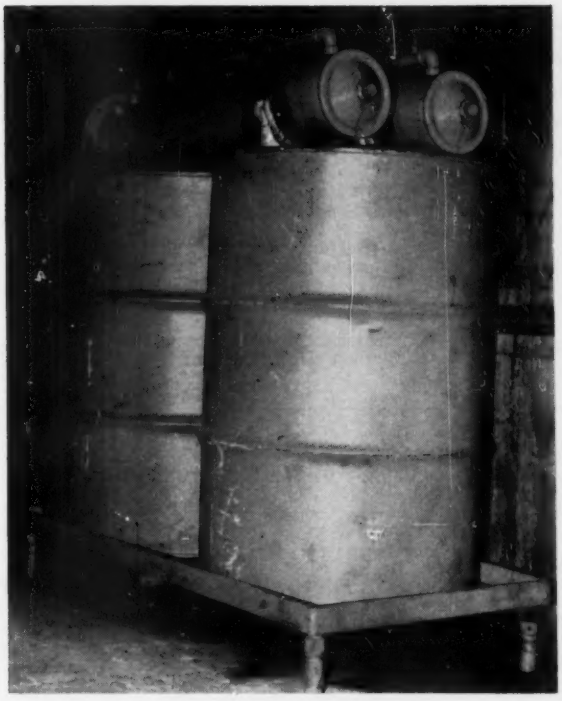


Fig. 9 (left). New rotary gear-type pump.

Fig. 10 (above). Steam drum sump with filters mounted on top.

tridge-type filters ahead of the filter bag tank and discontinued the use of the bags (see *Fig. 8*).

To eliminate these problems we replaced both plunger pumps with one small gear pump driven by a chain and sprockets from the layshaft. (see *Fig. 9*). We discarded the filter bag tank and replaced the sump beneath the floor with a pair of steel drums lined with epoxy resin (see *Fig. 10*). The cartridge-type filters were mounted on top of the drums in a position slightly tilted off the horizontal to facilitate drainage during pack changes. The gear pump has a capacity about double normal requirements when the engine is operating at full speed. When the engine gets up to speed, a spring-loaded by-pass valve partially opens to divert the excess oil back to the sump.

Although not all the pumps have been changed at this writing, we have had no pump failures on the units with the new gear pumps. We are confident that we have virtually eliminated bearing failure due to loss of lubrication.

Summary of Reconditioning Costs

W. O. No.	Title	Labor and Overheads	Outside Contract	Material	Less Salvage	Total Cost
7762	Repair unit #9	$ 5,321	$11,728	$ 6,958	$ 300	$ 23,707
7833	Repair unit #8	5,282	2,812	4,910	254	12,750
7856	Repair unit #5	13,948	4,587	3,632	—	22,167
7923	Repair unit #7	4,827	5,370	12,134	2,556	19,775
7947	Repair unit #6	5,644	3,567	1,260	—	10,471
7984	Repair unit #4	8,425	13,845	4,030	—	26,300
8083	Repair unit #3	11,647	14,614	4,928	—	31,189
	TOTALS	$55,094	$56,523	$37,852	$3,110	$146,359
	Average cost per unit	$ 7,870	$ 8,075	$ 5,407	$ 443	$ 20,909

Summary of Miscellaneous Work Order Costs

W. O. No.	Title	Labor and Overheads	Outside Contract	Material	Total Cost
7290	Install magnetos on ten Type 19 units (Average cost per unit $1,293)	$3,965		$8,960	$12,925
8156	Repair 5 power rods		$2,279		
8239	Repair 19 power rods*		6,338		
	Total for 24 rods		$8,617		
	* Includes metallizing and grinding three rods (Average cost per rod $359) (Present cost of new rod $1,295 net)				
8362	Install lube oil pumps and sump tanks (Average cost per unit $912)	$4,848		$1,555	$ 6,403

Summary of Materials Used

Item	Make and Model
Magnetos	Bendix LA-4
Lubricators	McCord Model 55
Oil pumps	Roper Type 27, Size 1F10
Power rod sleeves	No. 321 Stainless tubing, 2.5" O.D. x 2.25" I.D. x 54" long

• Lubricator pump failure

Another source of trouble was the force-feed lubricators which supplied lubrication to the power cylinders and packing (see *Fig. 11*). Because of wear the pumps would frequently lose prime. We found that one oiler was kept busy an average of six hours per eight-hour shift trying to keep these pumps operating and in adjustment. Many sets of rings and packing, as well as an occasional piston and cylinder, were ruined when these pumps stopped functioning.

Our solution was simple and straightforward—we junked them and bought new, improved models (see *Fig. 12*). Results to date are most encouraging. Maintenance of the pumps has dropped practically to zero. Adjustments are infrequent. Loss of prime has been completely eliminated. In addition, we have been able to reduce the oil consumption through the lubricators by nearly one-fourth. On a recent inspection of the power end of one of the units at our normal interval of reringing, we found the rings in such good condition and the cylinder so free of carbon deposits, that we reinstalled the old rings.

• Conclusion

Although the title "New Engines From Old" is admittedly a slight exaggeration, we feel that these units are, in some respects, better than they were when first installed. Our objective of reducing downtime and maintenance, at a fraction of the cost of new horsepower, has certainly been achieved. ■

This article has been adapted from a talk presented at the Oct. 13-14 meeting of the California Natural Gasoline Association held in Santa Monica, Calif.

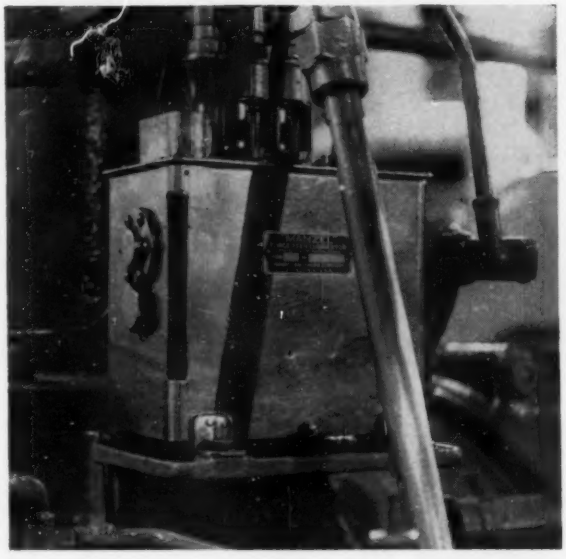
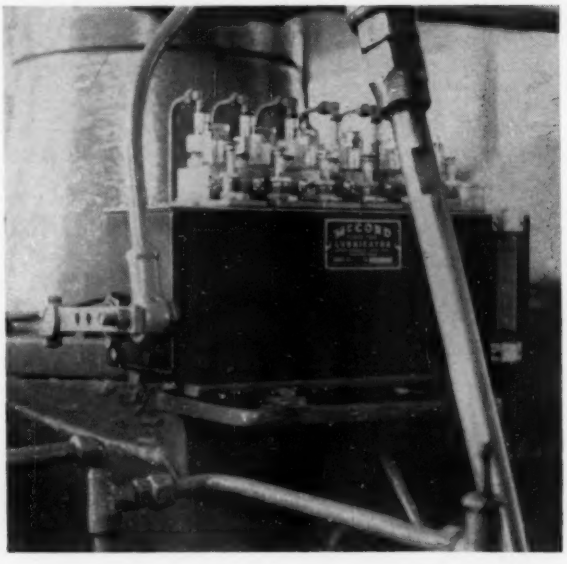


Fig. 11 (above). Old style force-feed lubricator.

Fig. 12 (below). New lubricator.



Through meetings, "we have the opportunity to share concepts of control and automation," author Friedli told the California Natural Gasoline Association when he addressed the group's annual convention in Santa Monica, Calif., in October. Then he placed before the delegates a new concept of automation for engine-compressor units and compressor stations, slanted in the operator's direction.

Automation for the operator

BY FRANK L. FRIEDLI, Manager, En-Tronic Controls Division
Cooper Bessemer Corp., Mount Vernon, Ohio

AUTOMATIC control systems for engines, engine-compressors, electric motors, turbines, and other types of prime movers have not reached the sophisticated design point where such systems will replace operating personnel entirely. Some systems have been put into operation recently in processes, pipelines, and production fields which have not replaced operators, but have—through additional training of the operators and in some cases relocation—permitted the operators to obtain additional skills and commensurate pay increases, and to increase his and his company's overall productivity in the particular area.

We have had automation in hundreds of forms, designs, and principles for over 30 years. As in all progressive development, the operator has played a tremendous part in establishing the machinery or system to be controlled. Therefore, practically all design concepts evolved today are the result of the operators' creative ideas being translated by engineers into working hardware.

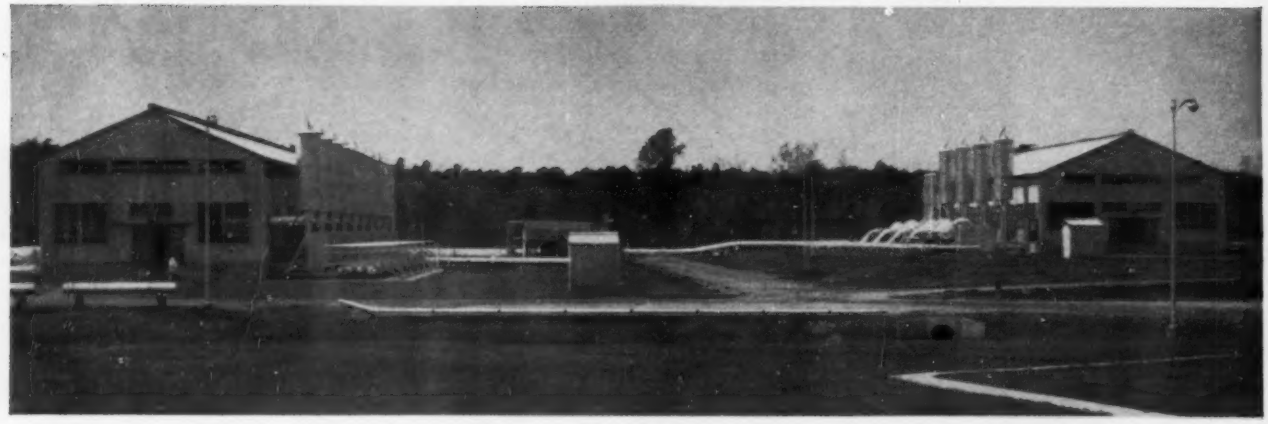
We use the term "system" to denote an assembly of indication and control devices arranged to perform certain work in logical sequence and provide an indication of the completion of the work. Through logical arrangements of control devices, the operator is relieved the burden of heavy manual labor and the tedious work of inspections and checks while the machinery is running.

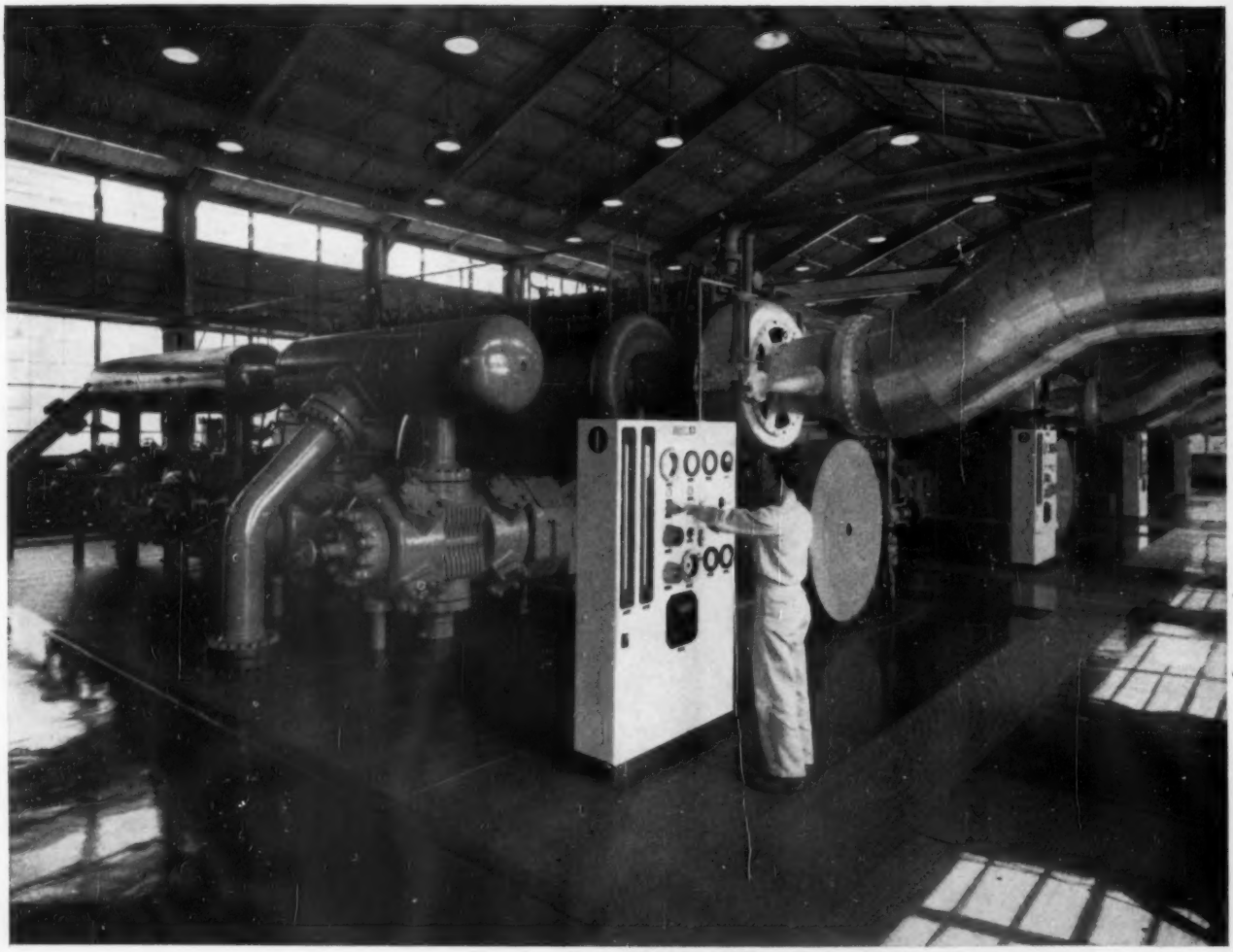
An adequate control system will permit the operator to perform more highly skilled work in his production area, will provide greater flexibility in production, and will protect machinery against "cratering" and subsequent loss of production. It has been proved that such systems will reduce overall maintenance "down time" and maintenance costs of replacement parts.

The oil and gas industry has already accepted the "indication" phase of operating machinery in that indication of temperatures, pressures, speeds, etc., have long been part of the machinery package. During the past several years, control of temperatures and pressures has improved with improvement in instrumentation and has been accepted in the industry. Unfortunately, the improvement in the longevity of the wearing parts of an engine or compressor has not advanced as fast as the industry would like to have seen, and now the "monitoring" phase is on the rise. Horsepower ratings on machinery have been increased resulting in higher work loads on wearing parts. In turn, this has caused the operating personnel to increase time for inspections and checks to insure proper functioning of machinery.

Therefore, the greatest single increase in automation has been to provide more "monitoring" of operating machinery. Again, the operators' experience has played a large part in establishing the basis of monitoring systems.

Union Church, Mississippi compressor station of Texas Eastern Transmission Corporation, as it looks today. Nine Clark HBA-8-T turbocharged units totaling 18,450 bhp are housed at left. Four 3400 bhp Clark turbocharged TLA-10 compressors are in adjacent building at the right in photo. Total Clark horsepower now in station – 32,050 bhp.





Four 3400 bhp Clark turbocharged TLA-10 compressors on the Texas Eastern line at Union Church station. Operator is shown at Clark automatic engine starting panel.

"HORSEPOWER TRIPLED, EFFICIENCY VASTLY IMPROVED, MAIN LINE FLEXIBILITY MAINTAINED,"

Reports Texas Eastern on its Union Church Station

In implementing expansion programs for its Texas to New York transmission system, Texas Eastern Transmission Corporation tripled the horsepower of the initial installation at its Union Church, Mississippi compressor station from 10,560 hp to 32,050 hp. In meeting the progressively increasing flow and changing pressure conditions, it was essential to retain line flexibility. By the addition of large reciprocating units in the station it was possible to increase station efficiency by the reduction of installation and operating costs per bhp.

In one of their programs, nine existing Clark HBA-8 compressors were converted to turbocharged operation. This was accomplished with the standard Clark conversion kits, thereby increasing the rating of each unit from 1760 to 2050 bhp while at the same time substantially reducing fuel consumption.

To further increase the horsepower of the station, four Clark turbocharged 3400 bhp Model TLA-10 compressors were installed, thus bringing total installed horsepower at Union Church up to 32,050.

The new TLA-10's gave Texas Eastern the positive dollar saving advantage of large blocks of horsepower which users have found results in lower installed and operating costs per bhp. Another important benefit of installing TLA-10's was the ability of these compressors to operate at compression ratios of 1.275 to 2.0. This is a vitally important factor in obtaining maximum operational flexibilty and expandability for future development.

Pipeline operators have found that the special low ratio pipeline compressor cylinders and Clark low loss nylon poppet valves used on the TLA-10 assure highest compression efficiency at a wide range of ratios. The constant pressure, pure turbocharging system used on the TLA, HBA-T and the new TBA permits operation of these units over a wide range of constant torque speeds at utmost fuel economy over the entire range. The Clark System of turbocharging also assures ample reserve *power* for emergency overloads, and traditional Clark ruggedness means the *stamina* is there to handle it.

There are four models of Clark TLA compressors available in the 1700-3400 bhp range and four models of TBA compressors available in the 1500-3000 bhp range. Your local Clark representative will gladly give you all the facts.

CLARK BROS. CO., OLEAN, N.Y.

CLARK® DRESSER INDUSTRIES INC.
OIL • GAS • CHEMICAL
ELECTRONIC • INDUSTRIAL

ENGINES
GAS TURBINES
COMPRESSORS

NOTE:
A total of 56 Clark reciprocating units are operating on the Texas Eastern system, together with 33 centrifugal pipeline compressors, including those serving in the compressor stations immediately above and below Union Church, Mississippi.

Without adequate monitoring, local and remote supervised operations are ineffectual.

We have found through years of service to the oil and gas industry that no truly "unattended" operating compressor station exists. People having considerable operating, production, and maintenance experience must necessarily "attend" these stations in a routine manner to keep them operating at the optimum performance level. Automation helps attain this high performance level only when the operating personnel attain the skill to adjust set points of control to service and maintain the control system as well as the other machinery involved.

Once adequate monitoring has been incorporated into a control system, operators started to clamor for easier ways to start and stop an engine-compressor unit, to open and close mainline valves, to control throughput or capacity, to limit loads to a safety area based on machinery ratings. And, with all other considerations, provide the means of maintaining greater continuity of production.

Contrary to popular belief, this trend was not started as a means of cutting labor costs. This came about as a result of operators' desiring safer methods and to reduce the possibility of human error in operations. The economic factors of labor, cost reduction, etc., came into the picture when production people attempted to justify the additional expenditures. For

Indication, Monitoring, and Control Points for Compressor Units and Compressor Stations

ENGINE COMPRESSOR UNIT

1. Engine overspeed
2. Engine vibration
3. Cooler vibration
4. Lube oil pressure
5. Lube oil temperature
6. Lube oil level
7. Lubricator
8. Lubricator level
9. Jacket water temperature
10. Jacket water pressure
11. Jacket water level
12. Hydraulic pressure
13. Hydraulic oil level
14. Air starting header temperature
15. Fuel gas header temperature
16. Turbocharger lube oil pressure
17. Turbocharger lube oil temperature
18. Turbocharger overspeed
19. Fuel gas pressure
20. Crankcase pressure
21. Main bearing temperatures
22. Piston over-travel
23. Detonation
24. Scrubber liquid level
25. Suction pressure
26. Discharge pressure
27. Compressor cylinder jacket temperature
28. Compressor cylinder packing gland temperature
29. Compressor cylinder discharge gas temperature
30. Interstage pressure
31. Interstage gas temperature
32. Control air pressure
33. Starting air pressure
34. Exhaust gas temperatures
35. Intercooler temperatures
36. Manifold air pressure
37. Engine speed
38. Compressor capacity control

COMPRESSOR STATION

1. Station suction pressure
2. Station discharge pressure
3. Station fuel gas pressure
4. Station starting air pressure
5. Station fire detection
6. Station explosive gas mixture
7. Station unauthorized entry
8. Station flow rate with integrator
9. Station suction temperature
10. Station discharge temperature
11. Station control gas pressure
12. Station capacity control

MASTER CONTROL STATION (REMOTE SYSTEM)

1. Station flow rate with integrator
2. Station suction pressure
3. Station discharge pressure
4. Station explosive gas mixture
5. Station fire detection
6. Station unauthorized entry
7. Engine compressor speed
8. Engine compressor condition

some time, the increase in skills needed to service and maintain control systems was ignored, but now the skill is recognized as mandatory and economically practical.

With this in mind, the "automatic sequential control" phase has risen rapidly in prominence. Practically all of the engine control systems built today have automatic sequential sub-systems included in the equipments. Once the operator had to perform heavy, manual labor to put a unit on stream. Now with control devices and heavy actuators doing the hard work, the operator is freed for a higher-skilled duty.

In certain specific areas, operating personnel have not improved their lot in the industry by offering creative ideas which would result in increased productivity for the man as well as his company. Many factors have and will govern the operator's lack of cooperation. One factor which does affect his thinking is that he has been told that hardware can be installed which will replace him entirely. This is not true. There is no substitute for good judgment emanating from the brain of a qualified, skilled operator. This hardware cannot "think" and perform satisfactorily unless man in his even inimitable way tells the hardware what work it is supposed to perform.

Interestingly enough, it was an operator who propounded the idea of remote control of compressors. He and his family had lived for nearly 10 years in a compound which was accessible by roadway only seven months each year.

In the early stages of "remote supervisory" control, the biggest drawbacks were communication link reliability, atmospheric conditions, and lack of skills to service and maintain the links. Initially, the telephone line pair held full sway. Today, radio and microwave radio have gained considerably on the telephone system. Communications people are claiming 99 per cent availability and operating time. The operation can only be as good as the operator located at the remote point.

As the industry progresses in the automatic processes, and pipelines and production fields become more complex, we require operational techniques which tax the ingenuity and capacity of the operating personnel. Some applications require automatic control systems which have a rate of response to operating conditions several times faster than the average man can respond. When these conditions must be met, the next phase of control appears.

This is the "computer control" arrangement. Operators will find automatic analog or digital calculating devices which receive several items of operating conditions, then after completing a calculation, responds to send out a control signal or signals to cause changes in operating units to meet new station conditions. Operating personnel generally are charged with the responsibility of confirming the operating parameters but not necessarily the responsibility of operating and maintaining the equipment. This equipment will be found not only in the compressor station but will more than likely be supplemented by a central "computer" unit, located as in the pipeline systems, in or near the dispatcher's center.

CONTROL SYSTEMS

Control system components and hardware are readily available today in "packaged" form. The systems generally installed are in these classes:

1. Electric control—with electro-mechanical actuators.
2. Electro-pneumatic control—electric control with pneumatic mechanical actuators.
3. Electronic-pneumatic — electronic control with pneumatic mechanical actuators.
4. Pneumatic—air- or gas-powered control with pneumatic mechanical actuators.

Operating personnel have in the past five years selected the pneumatic control and actuator system at least 3 to 1 over the other three arrangements for these basic reasons:

1. Readily adaptable to hazardous gas locations.
2. Does not require a major external source of energy to operate since air or gas pressure is the stable source of energy in any engine-compressor installation.
3. Easier to adjust and maintain in service.
4. Requires less energy to provide "fail-safe" operation.
5. Readily adaptable for remote supervisory control and "station and central computer" control.

As yet, do-it-yourself automation kits are not available. Some manufacturers claim to have reached the ultimate in automation for engine-compressor units. We have found that there are as many philosophies of automation as there are companies in the industry. No two systems are ever exactly alike, although the principles involved are comparable. The systems designers would prefer to see more standardization. The costs to the companies could be reduced. We believe the operators will bring this to a head and very soon.

Control system components and hardware are readily available today in the "packaged" form. The systems generally installed are shown in the accompanying box.

The cost of installing an automatic control system for an engine-compressor unit will vary from $30 per hp for the low hp units to $5 per hp on the larger units. Automation for a multi-unit compressor station with remote supervisory control and telemetering handled by a microwave radio system will run as high as $150 per hp. "Packaged" engine-compressor unit automation systems will vary from $5 to $10 per hp, depending upon the type of compressor service and source of energy to operate the system.

Accompanying this article is a list of the indication monitoring and control points generally considered in the application of automation. As you can see, the operators have won their points. ■

Plant foreman L. J. Whaylen inspects one of the 218-cfm compressors.

Compressors save gas from flaring

THREE packaged axial-flow, positive-displacement compressors, installed by the Shell Oil Co. at Little Creek, Miss., are believed to be the first of their type in natural gas field service. The compact Ingersoll-Rand compressors deliver gas from long gathering lines in the field to Shell's Little Creek gas processing plant.

When Shell put its new 5 MMcfd processing plant into operation in June 1959, design called for a suction pressure of 20 psig. As the gathering system developed, it was found that the pressure required on the edge well separators, to force gas through long lines to the plant, was in excess of separator design pressure. The gas was being pushed out to flare.

To reduce suction pressure at the plant would have been an expensive solution, involving another big reciprocating compressor or enlarged mainlines. Instead, Shell engineers decided to install three relatively economical booster stations on the problem gathering lines. For this service, they wanted units that would be moderate in initial cost, efficient to keep operating costs down, sturdy enough for continuous operation with low maintenance.

Three packaged compressor plants were assembled for the job by Reagan Equipment Co. of New Orleans, incorporating in each an Ingersoll-Rand Axi-Compressor driven by a Waukesha natural gas engine

Also boosting gas to Little Creek are two smaller stations. This unit serves the northeast lateral. Rating: 218 cfm at 3060 rpm.

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Have the protection of UGC Instruments VIGILANT

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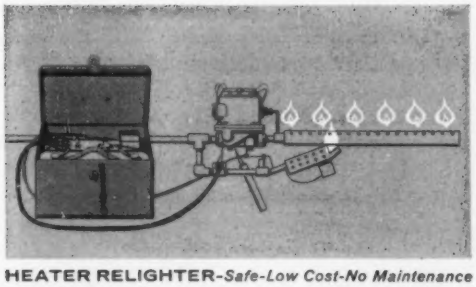

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The VIGILANT assures you that your heaters will stay in safe, continuous operation and protect your pipeline or producing equipment from freezing through years of trouble-free service.

The VIGILANT eliminates the chance of explosion and injury to personnel. In the event of pilot failure, the main burner is automatically cut off and stays off until the pilot automatically relights and is stabilized.

The VIGILANT maintains a constant temperature. An additional override control may be added to control the temperature of the gas stream. This feature will save countless dollars in that if the gas stream is up to temperature there is no necessity of firing the heater and holding the bath at an elevated temperature.

The VIGILANT is AUTOMATIC, SAFE, DEPENDABLE

Shell's Little Creek processing plant has a 5 MMcfd capacity and produces gasoline and propane.

through a Twin-Disc clutch and V-belt drive. Compressor, engine and auxiliary equipment are skid-mounted for easy installation. There are two Size 450X8 compressors rated at 218 cfm at 3060 rpm and one Size 562X9 unit rated at 438 cfm at a speed of 2920 rpm. All are designed for an inlet pressure of 25 psia and discharge pressure of 50 psia.

The Axi-compressor is a high-speed helical-type positive-displacement rotary compressor noted for its compactness and relatively high efficiency. The external driver turns a main lobe-type rotor which mates with a gate rotor driven through timing gears from the main rotor shaft. On the intake side, gas flows into the expanding cavity as the rotors open away from each other. The gas then is carried around the outside of the rotors to the discharge side and is compressed smoothly in a diminishing chamber as the rotors mate. This screw action of the helical rotors produces a smooth flow and permits the greatest output per pound of compressor ever achieved in a positive displacement unit.

The 438-cfm compressor is just 31 in. long (from end of rotor shaft to end of compressor), 14 in. wide (from flange to flange), and 18 in. high (from feet to top), and weighs less than 500 lb. It is driven by a 6-cylinder 5¼ x 6-in. Waukesha natural gas engine turning at 1400 rpm to run the compressor through V-belts at 2920 rpm. Engine capacity provides substantial reserve above the horsepower requirements of the compressor. The skid-mounted package requires little or no foundation. In this case, Shell has bolted it to a light concrete slab and sheltered it with a sheet-metal roof.

The three compressors went into service late in July 1960. The larger unit serves the west lateral with 8000 ft of 6-in. line gathering gas from 12 wells. Gas passes through a scrubber to the compressor which discharges into a 10-in. line for the last 3400 ft to the plant. One of the 217 cfm units serves the northeast lateral which has four wells sending gas through 5500 ft of 6-in. line to the booster station which discharges through 800 ft of 8-in. line to the plant. The other small compressor serves the northwest lateral. Here a trio of 4-in. and 6-in. lines totaling 5000 ft carry gas from 7 wells to the booster which in turn discharges into a 6-in. line for 3550 ft then into 3400 ft of 10-in. line to the plant.

The compressors are started up manually at the booster stations, but once in operation the units are quite self-sufficient. The engines have fan-cooled radiators. Makeup water for the cooling systems is provided automatically by small exhaust condensers. Each engine is arranged to shut down if jacket water temperature goes too high or lube oil pressure fails.

No lubrication is required in the compression chamber of the Axi-compressor since there is no metal-to-metal contact between the two rotors or between rotors and housing. The timing gears are enclosed in a separate oil-tight compartment and the rotor shafts are supported by anti-friction bearings in oil-tight heads outside the main housing. Normally, the Size 450 and 562 compressors have splash-type lubrication for gears and bearings. In this installation, two of the three units are equipped for force-feed lubrication with a shaft-driven pump to circulate the oil.

For natural gas service, all three compressors have oil-pressurized mechanical seals with rotating carbon faces. Included in each system are a pump, filter, oil cooler, and sump tank. Safety switches shut down the engine if compressor bearing oil or seal oil pressure drops.

The stations have a full complement of safety devices. The engines shut down automatically if gas discharge temperature or pressure go too high. In addition, there is a pressure relief valve on the discharge set 5 lb above the engine shutdown switch. Also, there is an automatic shutdown activated by low suction pressure to avoid pulling a vacuum on the gathering lines. ■

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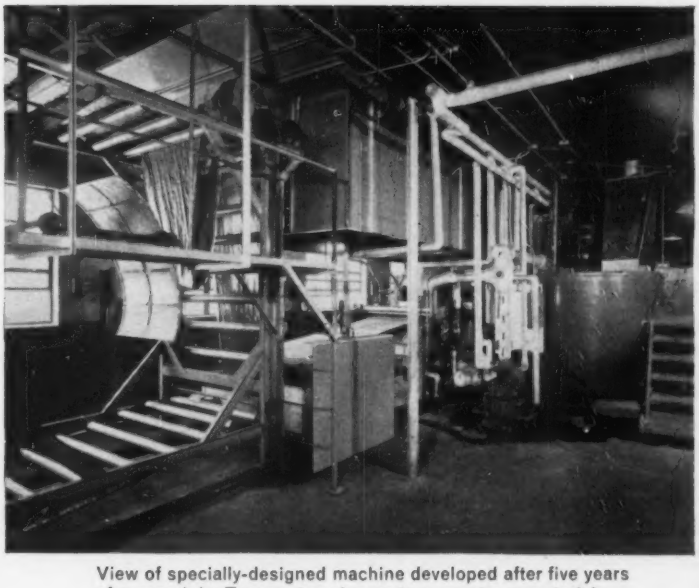

View of specially-designed machine developed after five years of research by Tapecoat engineers to convert raw materials automatically into TAPECOAT 20.

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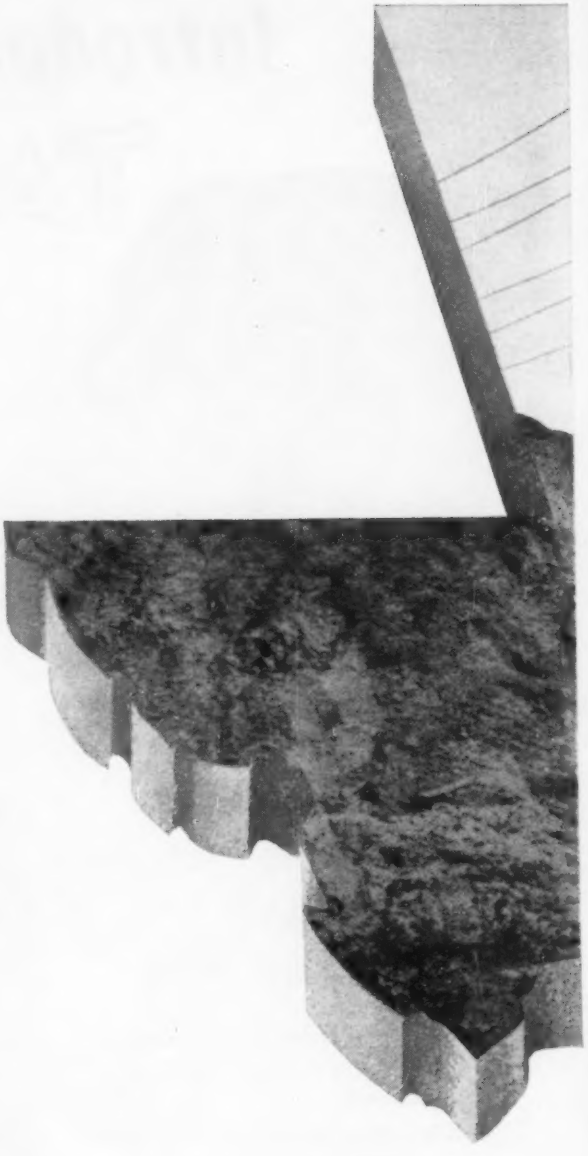
Old Ocean Fuel Company builds 367-mile pipeline...

to meet needs of electric utility for huge quantities of natural gas



Pipeline to carry fuel gas from Old Ocean field to four of the steam-electric generating stations of the Texas Electric Service Company power system

Old Ocean Fuel Company, subsidiary of Texas Electric Service Company, has recently completed a gas pipeline which spans the 367 miles between the Old Ocean gas field in Brazoria and Matagorda Counties and the Fort Worth and Graham areas. Natural gas transported in this line will keep four of the great power plants of Texas Electric Service Company's power system humming.

A. O Smith of Texas supplied 273 miles of 24-inch and approximately 24 miles of 20-inch "Made in Texas" pipe for this project. Since our first shipment of pipe in 1927, A. O. Smith has produced over 50,000 miles of large-diameter pipe. From our Milwaukee and Houston mills comes a dependable supply of pipe for almost every major pipeline project.

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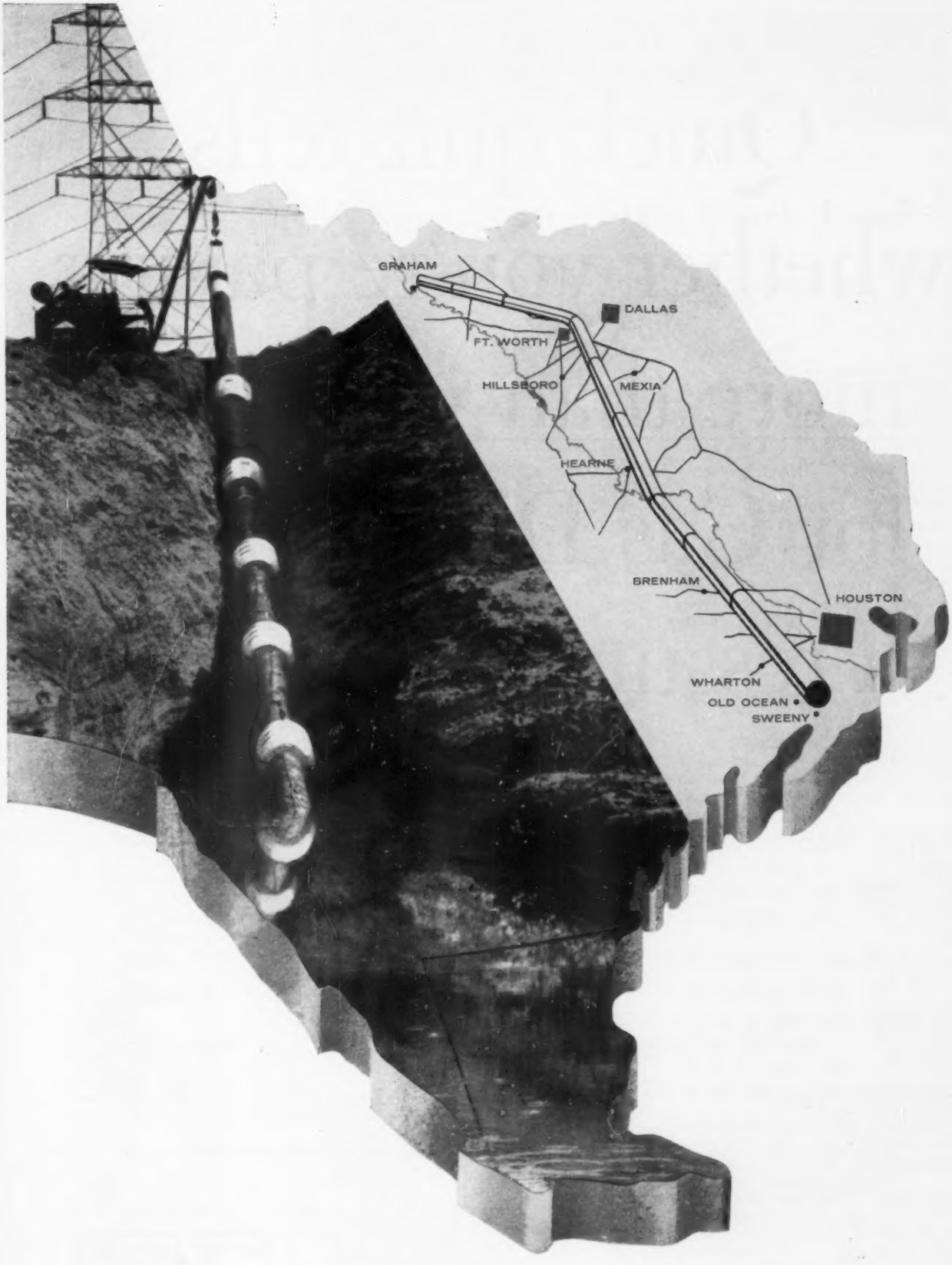
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A check in the "NO" column means your Foxboro field engineer can save you money —why not call him? The Foxboro Company, 341 Norfolk St., Foxboro, Mass.

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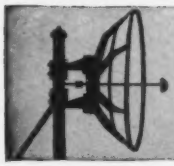
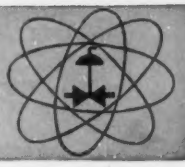


Communications and Automation



Edited by FRANK CHAPMAN

Where, Oh Where, is my little black box?

By F. VINTON LONG

FOR more years than I like to remember, I have talked about the "Black Box" concept of microwave communication.

And right now, it seems as far away as ever. Though our radio manufacturing brains have done wonders with missiles and astronomy, and most everything else, we have made zero progress on my pet subject.

Because it's been so long, I'll describe again this plan and maybe some engineer will see this and come up with an answer. Or maybe tell me why it can't work.

Firstly, we have two breeds of cats when it comes to radio communications systems.

We have the high density and we have the low density or the skeleton channel.

If we have need for the high density gear, then this column doesn't apply to you. And if you are going high density, you can go up to 240 audio channels with U. S. manufacturers, or if you have the money and the need, you can go to 600 domestically or 900 or so with foreign equipment. Since the foreign manufacturers don't have any pipelines to sell, they specialize on high density telephone grade equipment. I might add that the Japanese are a natural supplier of microwave equipment, because so much of it is practically hand made or custom built.

But getting back to the skeleton Black Box channels: there is a need for fence post-mounted microwave systems.

They must be completely transistor operated, and the transistors must not be temperature conscious.

They must operate on 960 megacycles or above, on storage batteries which float on a trickle charger from commercial power.

Or better yet, they operate from thermoelectric converters or fuel cells.

They carry just the base band, or one audio channel, and the customer breaks this up as he sees fit.

This means you can have narrow band receivers, and can use low transmitter power.

And I'm not fooling when I say mounted on fence posts. I might go a little further and say we could use a telephone pole. What I mean is that if we have to use a 300-ft tower, and a building, and tower lighting, and auxiliary generator power supply, we are already hooked and might as well use existing microwave equipment because it will be only a part of the total station cost.

No, we want these little jewels mounted in tin boxes which are bolted to the fence post or telephone pole.

And they will not have a service channel for maintenance because there won't be any maintenance.

Either they work or they don't and they are all plug-in construction so that all the maintenance they require is the plugging in of an East or a West black box subunit.

If we hold to this idea, we won't need the 300-ft towers, because we can afford to more closely space our relay stations.

Have any of you ever thought of the nice signal that might be pumped through short repeater paths? Then you don't worry so much over four-thirds earth curvature or one-third Fresnel clearance and all the other bugaboos of a fancy long haul multichannel microwave system.

If all sounds so simple, doesn't it? As a matter of fact, it is simple, and all we need is (a) a 960-megacycle transistor which will put out a little power; (b) a simple receiver with all transistors; and (c) some manufacturer who is willing to gamble on this market.

I think the manufacturers should know that this would be the only competition to common carrier offers for single channel systems, and many of our pipelines are now using only this single channel. ■

RCA makes microwave department assignments

Edward J. Hart has been appointed manager of Radio Corp. of America's microwave department. He will supervise microwave marketing, engineering and special projects.

Walter C. Byrne Jr. was named manager for microwave marketing; Haddon S. Wilson is custom microwave project manager; and Norman E. Edwards is manager of microwave engineering.

G-E expands microwave marketing setup

General Electric's communication products department is expanding its microwave organization to meet the needs of the newly created business microwave field.

Head of the new microwave field engineering unit is Al L. Caldera. Peter G. Smee manages the new microwave systems engineering unit.

Other appointments include Dennis W. Sparks as manager of multiplex design engineering and George M. Dewire as manager of RF design engineering.

White Diesel, manufacturer of dependable, economical Superior engines—renowned throughout oil and gas fields for over 25 years, announces a new line of compressors. White compressors are medium speed, heavy duty, balanced opposed types, 200 to 1000 BHP, and are specifically engineered for combination with Superior natural gas engines.

The complete, compact, *matched design* engine-compressor package provides, continuous, heavy duty service for gas gathering, gas lifting, repressuring and booster applications. Two-cylinder and four-cylinder compressor models in a wide range of cylinder sizes can be ideally matched to Superior gas engine horsepower to meet your most exacting requirements.

Outstanding advantages...

MATCHED DESIGN Six inch stroke White compressors coupled to 9 inch and 10½ inch stroke Superior oil field gas engines provide optimum combinations of piston speed, horsepower and service life.

SINGLE RESPONSIBILITY White assumes complete responsibility for all engine-compressor parts . . . warrants both units one full year . . . offers factory service and replacements parts from its extensive oil and gas field service organization.

GREATER FLEXIBILITY Speed of direct-connected engines (no belts or gears) can be varied from 600 to 900 RPM for easy control of compressor output. Compressor cylinders can be easily changed on same frame to suit changing volume or pressure conditions.

EXTENSIVE CYLINDER RANGE Standard sizes range from 4000 PSI, 2⅝″ dia. to 85 PSI, 22½″ dia., providing 68 different cylinders. Custom sizes and designs also available.

MEDIUM SPEED POWER TO 1000 BHP Model W-62, two-cylinder compressor, ranges from 200 BHP with Superior 6G-510 gas engine to 635 BHP with 8G-825. Model W-64, four-cylinder compressor, is rated up to 1000 BHP with supercharged 8GX-825 gas engine.

CONTINUOUS HEAVY DUTY OPERATION Compressors are designed to accommodate 40 to 100% greater piston rod load than similar compressors. Rugged engine-compressors can run unattended, unprotected from weather, and can handle continuous operating loads and temporary overloads with ease.

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635 H.P. Engine-Compressor Package.
Combination of Superior 8G-825 gas engine,
and White W64 four cylinder compressor.

200 to 1000 BHP

Matched Design

ENGINE-COMPRESSORS

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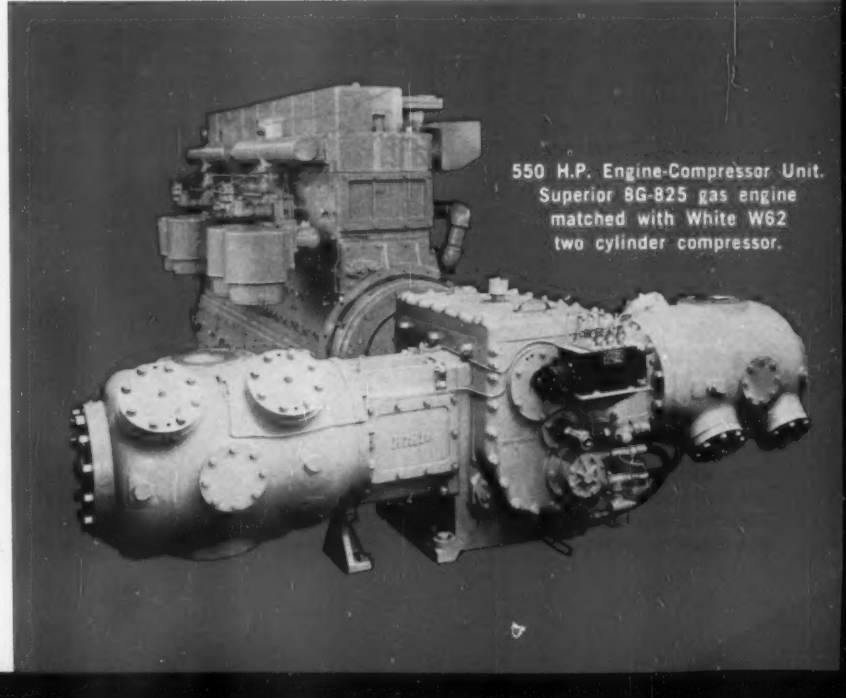

550 H.P. Engine-Compressor Unit.
Superior 8G-825 gas engine
matched with White W62
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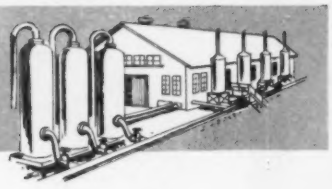


Enchilada Inch unfolds

TENNESSEE GAS TRANSMISSION CO. (Houston) and Southern California Edison Co. (Los Angeles) have made companion filings for California PUC authority to construct and operate the Mexico-to-Los Angeles Basin segment of the interesting Texas-Mexico-California natural gas pipeline. Actually, TGT's application is in the name of a new subsidiary based in Los Angeles — California Gas Transmission Co.

First, the planned ownership of the pipeline looks like this: The in-Texas portion—from near Corpus Christi to the Mexican border—will be owned by another TGT subsidiary, Tennessee California Gas Transmission Co. About 100 miles of 30-in. is proposed for this leg.

The in-Mexico section of the project, some 1200 miles of 34-in., will be owned by Pemex. And, the previously mentioned CGT will own the in-California segment. The same units will operate the respective parts.

Planned gas supply comes from two companies. Southern California Edison has negotiated two purchase contracts with Humble Oil & Refining Co. (Houston), the nation's largest domestic oil producer, for nearly 3 trillion cu ft of south Texas gas. This gas will be transported, if everything works out, by TCGT, Pemex, and CGT. Additional contracts between SoCalEd and Humble are being negotiated.

Petroleos Mexicanos (Pemex) is the second supplier. A third TGT subsidiary, Propulsora Internationale S.A. de CV (mercifully styled PISA), will buy Mexican-produced gas from Pemex. Pemex will then transport it for PISA's account in the Mexican portion of the Enchilada Inch. Edison will buy the PISA gas on the California-Mexico border. It is not known if a contract exists between TGT or PISA and Pemex, but an official of TGT has said that the volume will be a minimum of 75 MMcfd, and can build to 200 MMcfd. CGT will transport the Mexican gas into the Los Angeles basin.

Neither TGT nor its subsidiaries will sell any U. S. gas production to Edison.

The CGT application filed with California's PUC was for that part of the Enchilada Inch that will extend from the Mexico-California border near Mexicali and run through six counties, ending at Edison thermoelectric plants in or near Huntington Beach, Long Beach, El Segundo, Fontana and Redondo Beach. Plants will burn the natural gas under boilers for generation of electric power.

CGT's proposed project involves 292 miles of 34-in. pipeline and 10,000 compressor hp. Cost was estimated at close to $50 million. Estimated total Enchilada Inch cost: $225 million.

The application pegs delivery volume at 230 MMcfd as the initial maximum and floats to a max-day of 455 MMcf by the fifth year and extending through the remainder of the 20-year contract period.

In view of an earlier statement of Bill Witmer, a TGT senior vice president and president of California Gas Transmission and Tennessee California Gas Transmission, the 34-incher, after full powering, may be designed to move 750 MMcfd into California. Thus, potential capacity for potential additional customers may be potentially available. The application states: "The natural gas consumers being served by the gas distributing companies also derive immediate and future benefits from the service proposed herein. The Mexican produced gas which Edison is willing to release in order to permit the gas distributing companies to purchase the same for peaking purposes can be delivered through applicant's pipeline."

The delivered price for Enchilada Inch firm gas in the Los Angeles basin seems to average 45 cents or less over the full 20-year period. Gas from Humble Oil is specifically restricted from resale.

As mentioned, Southern California Edison Co., the customer, so far, filed a companion application with Cal-PUC. In it, this company also pointed out that some of the gas from the TCGT - Pemex - CGT pipeline would be made available to Southern California and Southern Counties Gas companies if needed to meet demands of consumers during periods of peak use.

In a release, Edison's Robert P. O'Brien, vice president, had this to say about the project: "This pipeline proposal will benefit our customers because it provides a superior source of fuel for electric generation at a more stable price over the next 20 years."

He pointed out that Edison's largest single operating expense—other than labor and taxes—is cost of fuel ($140,000 per day). Citing pressure exerted by Los Angeles smog regulations on existing gas supplies, he assures that the proposed agreement will provide Edison customers with an annual supply of fuel for dependable electric service. And, "Approval of the proposed pipeline," O'Brien said, "would stake out for the southern California area gas supplies from two new producing areas—in south Texas and northern Mexico—with huge potential reserves."

Edison's need for natural gas can be traced by these assertions. It now produces about 20 per cent of its electricity output from hydroelectric plants. But, it feels it has dammed all presently economically feasible dam sites. Hence, it has to increase power generation through the thermoelectric process.

Natural gas seems to be ". . . the only source of long-term fuel supply with acceptable air pollution characteristics that can now safely be acquired in large quantities," Edison says. The electric utility states that it has tried "vainly" to obtain a gas supply from SoCal and So-Counties Gas companies meeting its requirements, such as—dependable, long termed, stably priced, and delivered in adequate volume.

Edison's picture of gas prices looks like this: The interruptible supply from Pacific Lighting Corp. companies currently costs 38 cents per Mcf. And Edison feels increases will come as PLC's contracts with existing producers expire, beginning in 1967. It fears new contracts

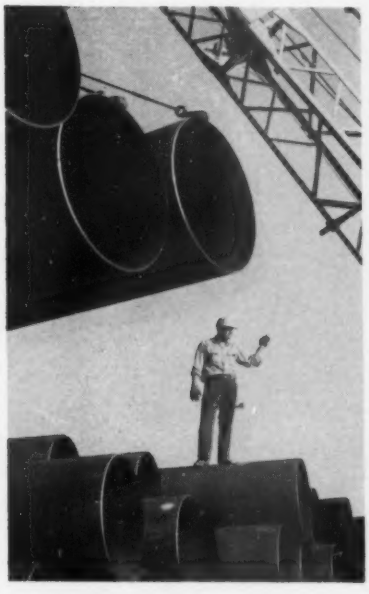
will increase gas cost to all classes of users, and, over the next 20 years, the price for interruptible gas from Los Angeles gas utilities may well approach or exceed the price for firm gas from the Enchilada Inch.

Edison says the price of firm gas from TCGT-Pemex-CCT's proposed project will average not more than 45 cents per Mcf over the 20-year period.

What about the argument from the Los Angeles gas companies that loss of Edison's generating plants as interruptible customers would result in higher gas prices to their millions of gas consumers? Edison has these things to say: (1) It is a situation that the gas utilities would have to face at sometime in the future anyway as atomic energy moves into Edison's power supply; (2) the trend in price increases for gas service in southern California (one rate increase per year for the past 15 years) indicates that prices to consumers will continue to rise with or without Edison's interruptible loads; and (3) if gas prices to firm customers do increase with loss to Edison's plants, it "confirms our belief that they (Pacific Lighting System) has been charging Edison higher rates than were justified in order to subsidize their other customers."

As would be expected, Southern California and Southern Counties Gas companies will "vigorously" oppose these applications. The opposing viewpoints will be aired before the California PUC sometime after Jan. 1, 1961. It will probably be a long, bitter fight.

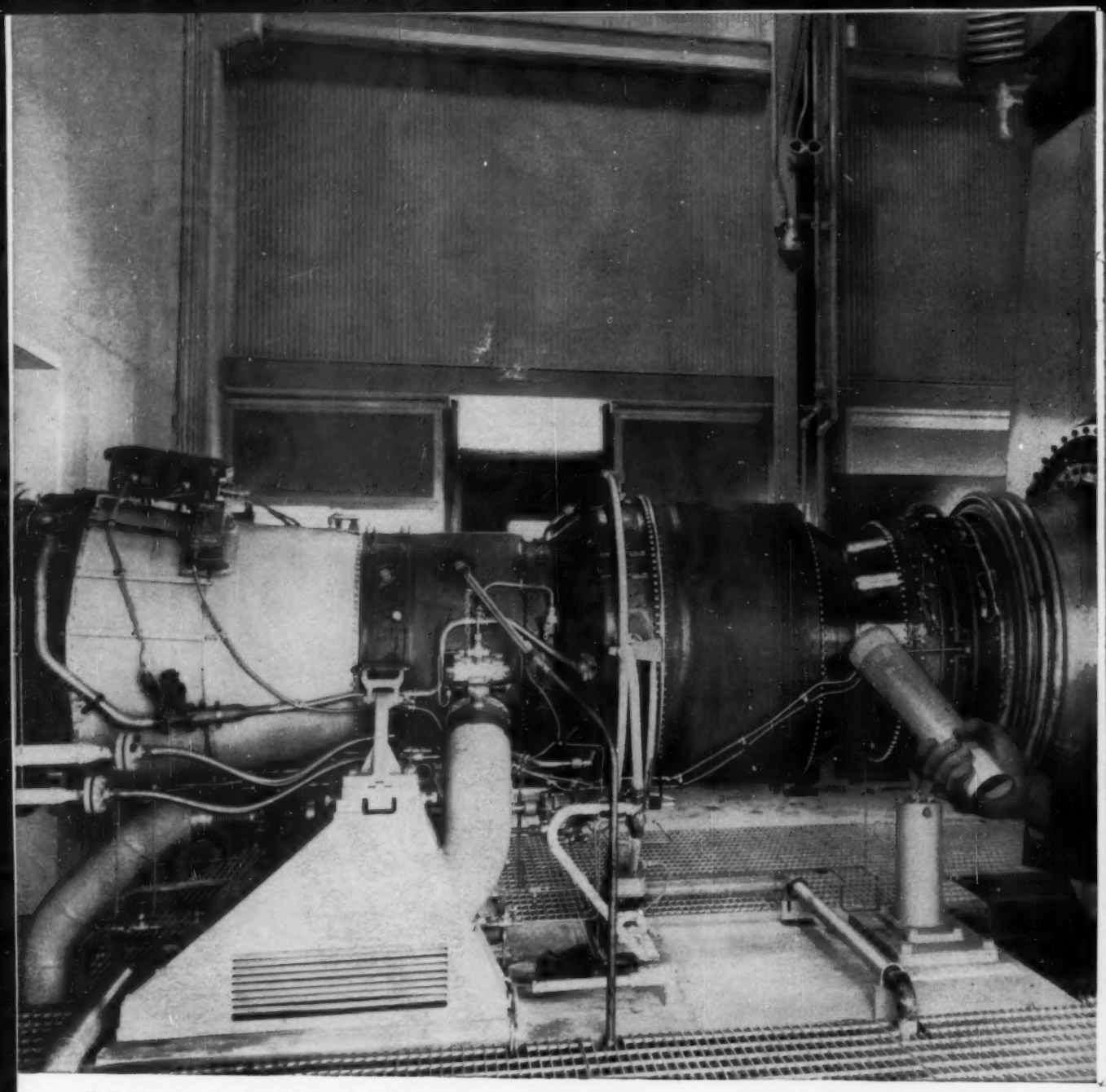
News pix



First shipment of 36-in. steel line pipe heads for the southern end of Pacific Gas & Electric's 1400-mile line from Antioch, Calif. to gas fields near Edmonton, Canada. Pipe was shipped from Kaiser Steel's Napa, Calif. plant.

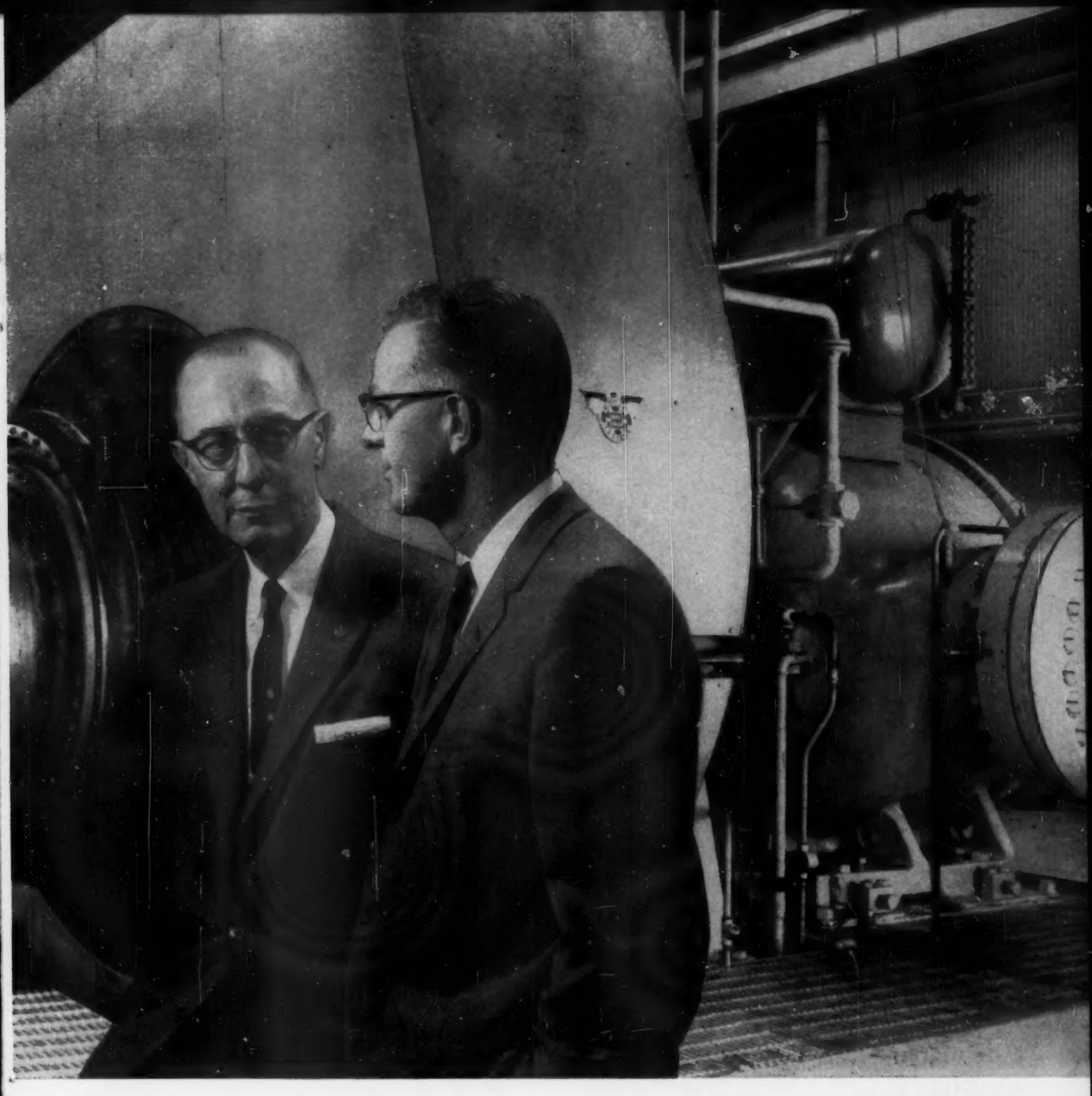
Some 50 engineers from pipeline construction and operating companies watched Midwestern Pipe Line Products Co. demonstrate the new Betzel portable pipe coating and wrapping machine. The 4000-lb, self-contained unit hooks on the back of any car or light truck. It can process up to 20,000 lineal ft per day with only 10-minute breaks to switch pipe sizes.

More than 22 miles of a special plastic-coated steel pipe will carry natural gas through highly corrosive coal field soil and swampland in Kentucky. The new line is serving the towns of Corbin and London. Republic Steel's X-Tru-Coat was laid at the rate of 6000 ft a day. The most corrosive agent along the route is the acid formed by rain and other moisture draining through piles of coal slag. The plastic coating is expected to keep such corrosive agents and the steel pipe separated permanently. Hence, a reduction in the cost and need for pipe replacement and maintenance is anticipated.



R. L. Boyer, *Vice President and Director of Engineering, and* W. B. Boyum, *Manager of Gas Turbine Sales, The Cooper-Bessemer Corporation report . . .*

World's first jet powered gas turbine is now on the job



YOU are looking at a revolutionary new concept in industrial power. This Cooper-Bessemer 10,500 hp RT-248 gas turbine with a modified Pratt & Whitney Aircraft J-57 jet engine introduces new, drastic economies in plant construction, operation and maintenance. Shown here on the job at the Clementsville (Kentucky) Compressor Station of Columbia Gulf Transmission Company, this powerful, compact unit has taken on the total gas-boosting load of the station, operating 'round the clock. Find out how this outstanding joint development of Cooper-Bessemer and Pratt & Whitney Aircraft can fit into *your* plans for compressors, generators and other rotating machinery. Call our nearest office.

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COMPRESSORS: RECIPROCATING AND CENTRIFUGAL, ENGINE, TURBINE OR MOTOR DRIVEN

New mill triples pipe production

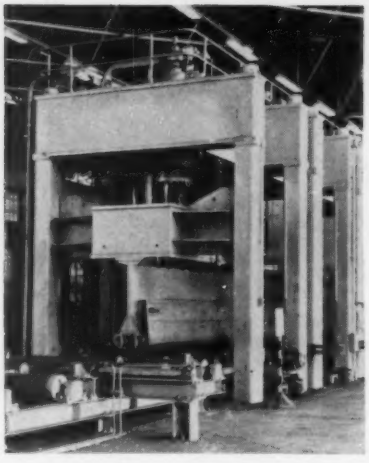
High-strength, large-diameter steel pipe is now being produced at Bethlehem Steel Co.'s new expanded line pipe mill at Steelton, Pa.

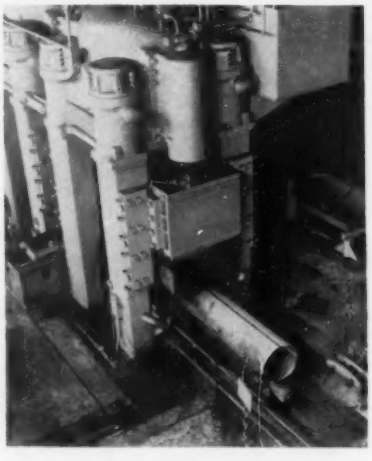
Gas pipe production at Steelton is expected to triple. About 25,000 tons of line pipe from 18 to 42-in. OD can be produced each month. This is equal to about three miles of pipe a day.

Before the mill went into operation, Bethlehem produced pipe by first rolling 20-ft lengths of steel plate into cylindrical form. Then two sections were butt welded together to form the standard 40-ft length.

Now, Bethlehem forms this pipe on two giant presses. The first, a 2500-ton hydraulic U-ing press, transforms a 40-ft length of steel plate, up to ¾-in. thick, into a long "U" in about a minute. The second, an 18,000-ton hydraulic press, takes another minute to complete the shape, turning the "U" into an "O." This quick forming is the key to the rapid production of high-quality pipe at rates up to one 40-ft length every two to three minutes.

Since the gas transmission pipe is not a shelf item, but is made to order per the customer's specifications, little storage space is required. Sections are shipped out as made. For example, eleven 36-in. diameter pipe sections per rail car, or fourteen 30-in. sections.





The two giant presses that speed pipe production at Bethlehem Steel's new expanded line pipe mill are shown here. Above is the 2500-ton hydraulic U-ing press; below is the 18,000-ton capacity O-ing press.

South Texas-Transco gas sale okayed

FPC adopted, with some changes, a presiding examiner's decision authorizing South Texas Natural Gas Gathering Co. to sell a maximum of 70 MMcfd to Transcontinental Gas Pipe Line Corp., Houston.

Action also allows 41 independent producers and one pipeline company — Tennessee Gas Transmission—to sell gas to South Texas for resale to Transco. South Texas buys the gas in various south Texas fields. Initial field prices range from 9 to 17 cents per Mcf. Transco will pay 20 cents.

Last September, presiding examiner Kurtz okayed everything but the sale by TGT. He questioned whether the public interest would best be served by having TGT sell the gas to South Texas for resale or by taking it into its own system. However, FPC saw no need to interfere with the discretion of management in the matter. It did point out that the price to distributing companies would be lower if the gas were sold by Transco rather than TGT.

Several intervenors and the FPC staff asked that certificates be conditioned to require a lower initial price for the gas. But the commission agreed with Kurtz that no price conditions should be imposed. In doing so, FPC cited the lack of automatic triggering, or any effective triggering of escalation clauses in Transco's contracts. It also said the proposed prices appear to be "in line" entirely apart from the fact that they are below the area price levels set out in Policy Statement 61-1.

Miss. PSC controls interstate lines

Mississippi's PSC order giving the commission jurisdiction over interstate gas pipelines selling direct to customers within the state has been upheld by the Hinds county (Miss.) chancellor.

The ruling came on an appeal by United Gas Pipe Line Co. and Texas Gas Transmission Corp.

Under the decision, PSC has authority to tax out-of-state companies whose lines pass through Mississippi and who sell direct or for resale purposes to Mississippi customers.

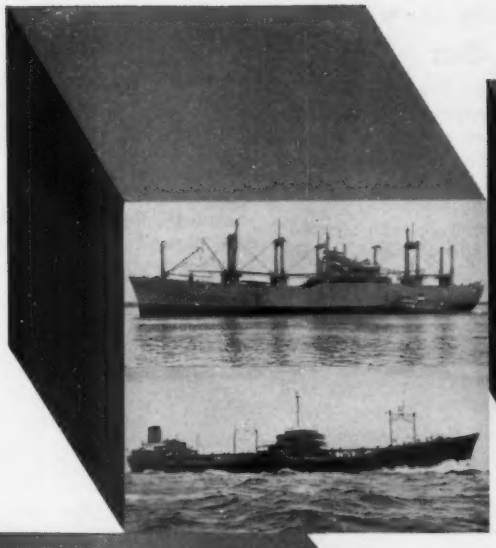
UGPL and Texas Gas attorneys argued that the legislative act creating the PSC confined the commission's jurisdiction to "intrastate" companies and "did not confer jurisdiction over direct sales of natural gas to consumers by interstate pipeline companies."

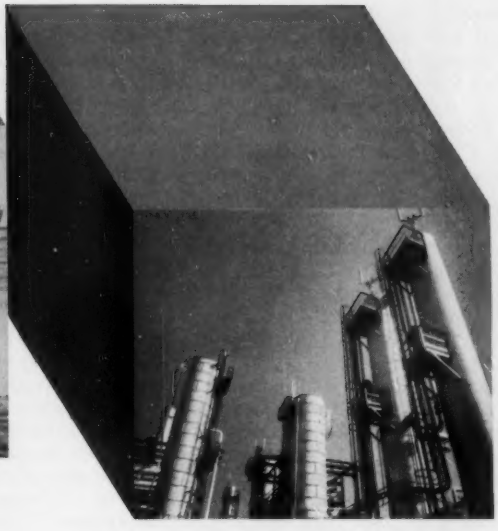
The chancellor said "If we construe the meaning of the word 'intrastate' throughout the act in its strict sense and definition, then in my opinion, the appellants are correct and both cases should be reversed."

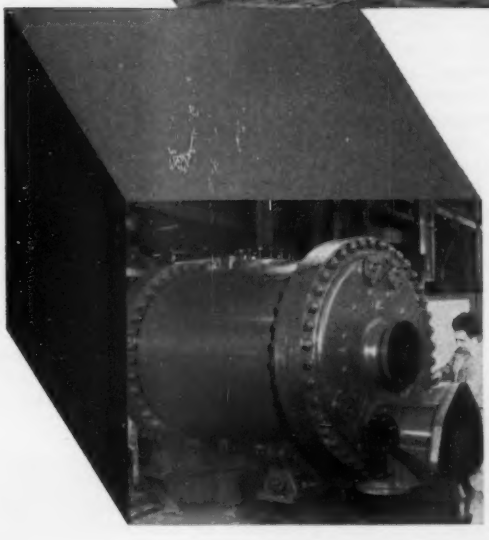
However, he said, "It is manifest to me . . . that the legislature intended to and did grant the commission authority to regulate all utility business in the state not vested in the FPC under the Natural Gas Act . . . or not specifically excepted in the Utilities Act."

"Our construction of the word 'intrastate' also closes the suggested gap between the regulation by FPC and our commission, which is direct sales of natural gas to consumers in this state by interstate pipeline companies, and protects such interstate utilities operating in this state, and consumers of natural gas purchased directly from them, as our legislature intended."

The PSC's action would require interstate pipelines operating within the state to pay their share of a $200,000 a year maintenance fund. Section 36 of the state's Public Utilities Act requires natural gas utilities regulated by the commission to pay taxes to cover expenses of the commission.







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North Dakota studies MDU's rate of return

According to the North Dakota PSC, it has conducted a check up that indicates Montana - Dakota Utilities Co. is making about 8 per cent on its investment in a line from Tioga to Minot.

PSC Chairman Anderson considers this margin "to be an excessive profit. . . ."

Montana-Dakota and the commission were in litigation over the pipeline for some time, with the question of PSC's authority in tying up start of gas service to Minot. However, gas service started in January 1956.

While PSC authorized construction of the intrastate line, it imposed rate conditions that were questioned by MDU. The company challenged PSC's authority to require certain rates. The fight eventually went to the state supreme court, which remanded the matter to PSC for further action.

Early in the controversy, MDU estimated its return on investment would be 3.25 per cent by the third year of operation.

Commission accountants are checking MDU's records to determine the exact amount of return.

FPC studying INGAA's revised rate plan

FPC is studying comments on a plan to allow gas producers to put rate increases into effect on or about the dates they desire. INGAA proposed the change. Now, increases are suspended for up to five months after the proposed effective date.

INGAA's plan would permit independent producers to file proposed rate increases up to seven months in advance of the effective date. If the request came in six to seven months in advance, suspension could be no longer than a day under the new plan. If no decision were reached then, the higher rates would go into effect subject to refund.

New division at FPC

FPC has set up a new division of economics in the chief accountant's office.

It will be responsible for providing consulting, advisory, and technical assistance to the commission on economic problems arising from administration of the Natural Gas and Federal Power Acts or other statutes and executive orders.

Realignments for Tennessee Gas

Tennessee Gas Transmission Co. has moved to more clearly separate its non-regulated natural gas pipeline business from its several oil operations and diverse other free-enterprise businesses.

Two new companies are formed: Tenneco Corp. and Tenneco Oil Co. Tenneco Corp. is a subsidiary of Tennessee Gas Transmission Co. It will own the Transmission Co.'s non-regulated interests in petrochemicals, life insurance, real estate, etc. Tenneco Oil Co. too will be a subsidiary of Tenneco Corp. It will operate the Transmission Co.'s far-flung producing, refining and marketing properties. In effect, it is an integrated oil company.

Three former divisions of TGT, whose operations have been transferred to Tenneco Oil Co., will now disappear. These were Tennessee Gas & Oil Co., Tennessee Oil Refining Co., and Tennessee Overseas Co.

Tennessee Gas Pipeline Co., set up directly under Tennessee Gas Transmission Co., continues as the operating unit for the big primary TGT system running from the Mexican border to New England. Midwestern Gas Transmission Co. (with two lines in the Midwest) and East Tennessee Natural Gas Co. (with a line in Tennessee) also will be direct subsidiaries of Tennessee Gas Transmission.

Tenneco Corp's board chairman is Gardiner Symonds, with Cecil C. Johnson as president. Directors, in addition to Symonds and Johnson, are Harold Burrow, R. L. McVey, and R. C. Graham. Tenneco Oil Co.'s board of directors has Symonds as chairman, R. R. Dean as vice chairman, and Burrow, Johnson and Graham. The latter is president of Tenneco Oil Co.

GAS • Pipeline Notes

Trans-Canada Pipe Lines Ltd. recently set a new record peak day sale at 543 MMcf, according to president James W. Kerr. This compares with last year's peak day of 286 MMcf.

Daniel Orifice Fitting Co., Houston, appointed William B. Wickersham & Co. as executive sales representative in New England and Chipley & Jensen Inc. as representatives in the Milwaukee area.

A new service offered by the University of Tulsa is the abstracting of technical literature and patents covering exploration and production. The fields of geology, geophysics, chemistry, and engineering will be covered. Abstracts will come from some 500 American, European, Russian, and Japanese sources, including 7000 to 9000 articles and 1500 to 2000 U. S. and foreign patents. The service will publish a weekly bulletin with the abstracts included.

Pipe Line Service Corp. has started construction of a steel pipe coating and wrapping plant in Youngstown, Ohio. The 94,000-sq ft plant is the eighth pipe coating plant operated by the company. It will have a pipe coating capacity of about 1500 carloads annually.

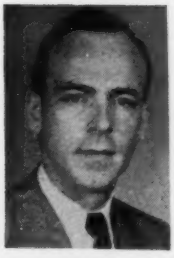
The Superintendent of Documents (Washington 25, D. C.) is selling copies of FPC's revised Uniform System of Accounts Prescribed for Natural Gas Companies. Price is 50 cents per copy.

Hope Natural Gas Co., Clarksburg, W. Va., can spend $1 million on new pipeline facilities in Kanawha county, W. Va. (Docket CP61-15). Involved are three 440-hp and one 660-hp compressor units at the existing Jackson station and about three miles of 8-in. line.

Dresser Industries Inc. has formed a new organization to be known as Dresser Electronics. It will include all the activity in the electronics field of two Dresser subsidiaries, Southwestern Industrial Electronics Co. and Hermetic Seal Transformer Co. They'll now be known as Dresser Electronics, SIE Division, and Dresser Electronics, HST Division.

Armco Steel Corp. is spending $2.5 million to consolidate its spiral welded pipe making operations in a fully integrated plant in Middletown, Ohio. Four new buildings with 207,000 sq ft of floor space are included in the plans. Two new Driam pipe-making machines will be installed. Also planned by Armco is a combination pipe mill at the Ambridge, Pa., plant of its subsidiary, National Supply Co. Designed primarily for continuous weld and electric-weld steel pipe, the new mill also can be used to stretch-reduce seamless pipe to smaller sizes.

GAS Pipeline People



H. J. Hewett Jr.
Transwestern

HAROLD J. HEWETT, JR. from Sargo S. A. Oleoductos y Gasoductos, Buenos Aires, to market analyst on sales and distribution, Transwestern Pipeline Co., Houston.

W. D. MORNINGSTAR from assistant treasurer and assistant vice president of Pacific Lighting Gas Supply Co., Los Angeles, to treasurer, succeeding C. EDWARD PEARMAN, who is retiring.

W. D. Morningstar
PLGS

RAY J. LYNCH from assistant controller of Michigan Wisconsin Pipe Line Co. to treasurer of both Michigan Wisconsin and American Louisiana Pipe Line Co., Detroit.

W. T. THAGARD from manager of Texas Eastern Transmission Corp.'s coordinating and planning department to vice president, directing TET's diversification activities in the field of carrying coal by pipeline.

J. D. MCNEILL from National Supply Co. to sales engineer for Grove Valve & Regulator Co. in Calgary, Canada.

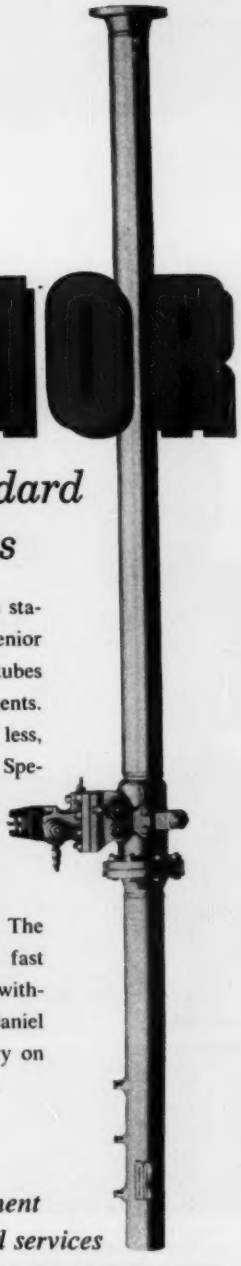
Ray Lynch
Mich-Wis.

ROBERT N. CURRY from assistant superintendent of gas measurement to assistant superintendent of dispatching, Texas Gas Transmission Corp., Owensboro, Ky.

J. LUTHER CLEVELAND, chairman of the executive committee of the Guaranty Trust Co. of New York, named a director of Southern Natural Gas Co., Birmingham.

New regional managers named by Tube Turns, Louisville, Ky.: S. M. HARDISON, Atlantic region, New York; HERBERT P. SMITH, north central region, Pittsburgh; J. C. ELLSWORTH, northern region, Chicago; JAMES F. CRAIG JR., southeastern region, Atlanta; E. R. MUIR JR., central region, Louisville; L. D. HALL, midwestern region, Kansas City; L. O. MORRIS JR., mid-continent region, Tulsa; W. B. WHENTHOFF, southwestern region, Houston; N. P. BOSEMER, Pacific region, Los Angeles.

W. T. Thagard
TET



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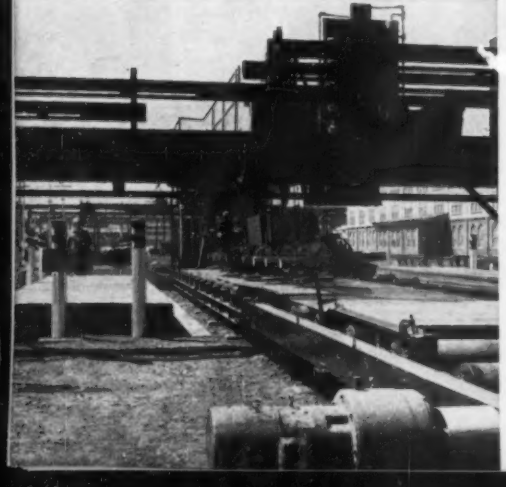
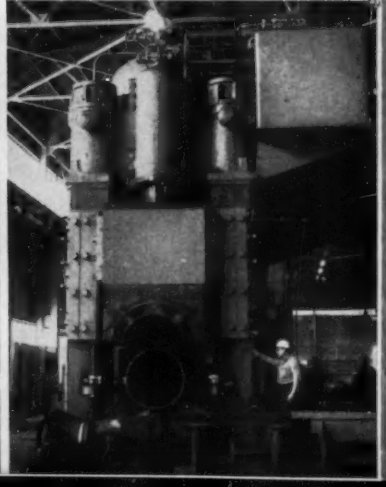


The prepared plates enter the U-ing press, where they are formed in a matter of seconds. Then . . .

. . . into the 18,000-ton-capacity hydraulic O-ing press. This machine can readily form plate ¾ in. thick.



BETHLEHEM LINE PIPE

Diameters to 42 in. OD . . . walls to 3/4 in.

We're now turning out electric fusion-weld line pipe (18 in. to 42 in. OD) in 40-ft lengths on our new mill at Steelton, Pa. The most modern in the industry, it assures Bethlehem customers of a plentiful supply of pipe meeting API 5LX specifications, as well as non-API pipe in the largest diameters and wall thicknesses presently available anywhere.

The mill's facilities, most of which are equipped with electronic controls, includes newly installed edge and end planers, U-ing and O-ing presses, and welding machines. The only "old" production facilities remaining are the hydraulic pipe expander and the end facer—both installed in 1957.

With this new mill in operation, Bethlehem can meet your most demanding requirements for quality, delivery, and size. The Bethlehem sales office nearest you will give you prompt action on your inquiries.

Line pipe to 16 in. OD made at Sparrows Point, Md.—Our modern electric resistance-weld mill produces API line pipe from 5-9/16 through 16 in. OD, in lengths to 60 ft. We also produce continuous buttweld pipe from 1/2 through 4-1/2 in. OD.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

EXPORT SALES: Bethlehem Steel Export Corporation

One of the automatic submerged-arc welding machines making an inside seam. Not shown are the outside welders.

After thorough visual inspection, the 40-ft lengths are fed into the hydraulic expander. It can expand pipe 42 in. OD, with ¾-in. walls.

After fluoroscopic inspection, the pipe is end-faced as shown here. This operation assures the proper bevel for field-welding.

DAVID SALLS named manager of gas industry, sales, Cooper-Bessemer Corp., Mount Vernon, Ohio; WILLIAM B. BOYUM named manager of gas turbine sales; and WARREN RHOADES named design engineer for special projects in the development division of engineering.

ROY F. BENNETT, petroleum exploration consultant, joined Dresser Electronics, SIE division, as assistant to president George A. Peck.

PAUL B. GRIEG JR. appointed division geologist, Texas Gas Exploration Foreign C.A., Calgary.

David Salls
Cooper

W. B. Boyum
Cooper

J. T. WOOTEN named chief engineer; J. H. CRETSINGER, head of the reserve and deliverability section; and ARMANDO DE LEON, administrative assistant to Transwestern Pipeline Co.'s vice president, William B. Padon.

CARL JOHN MAKI transfers from Dresser Industries to manager of the gas supply department of Texas Eastern Transmission Corp., Owensboro, Ky. and JOHN S. ADAMS is assistant manager of gas supply.

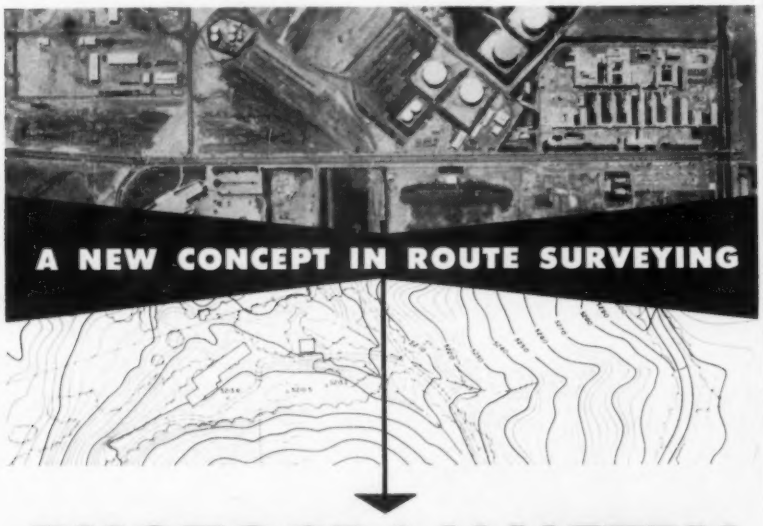
MILTON A. PILCHER, former budget examiner with the Bureau of the Budget, has succeeded J. KAY LINDSAY as director of administration for FPC.

President of the newly formed Natural Gas Men of Houston is HAROLD E. VAUGHAN of Transcontinental Gas Pipe Line Corp. E. RUE THOMAS of Trunkline Gas Co. is 2nd vice president and JACK GALE of Transco is secretary.

Two-way radio assignment

Raymond Minichiello is the new manager of mobile communications product planning for General Electric's communication products department in Lynchburg, Va. He is responsible for product development guidance on vehicular two-way radios, portable transceivers, pocket units and associated systems devices.

Minichiello replaces Dale L. Bundy, who has joined Communications Engineering Co., Dallas, as a sales engineer.



PHOTOGRAMMETRY

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"Placing our 150-mile line on an **accepted coordinate system** thru the photogrammetric approach applied by Pacific-Aerial not only **cost less per linear mile** but saved the cost of the entire survey almost immediately by averting at least two major errors that almost certainly would have occurred had conventional surveying methods been employed."

* *Names available on request.*

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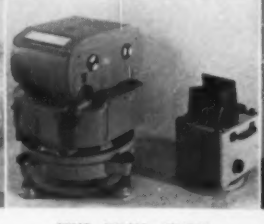
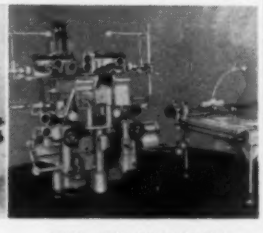


ZEISS AERIAL CAMERA



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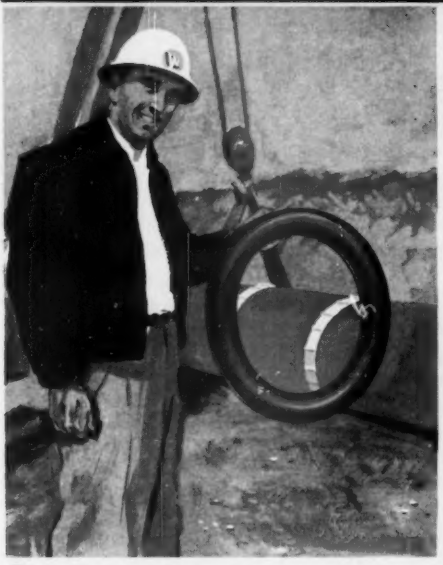
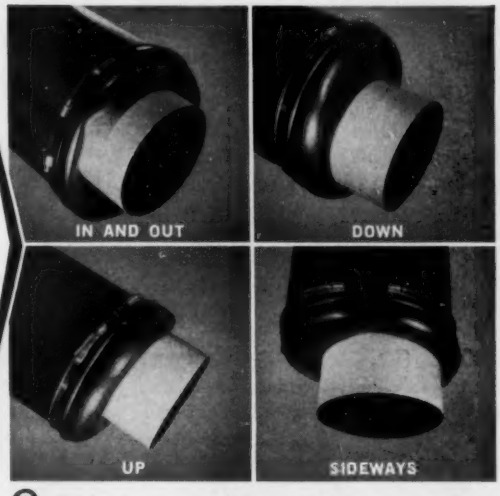
NEWS FROM DOWN THE LINE!

A NEW VERSATILE AND ECONOMICAL SEAL FOR CASED CROSSINGS...



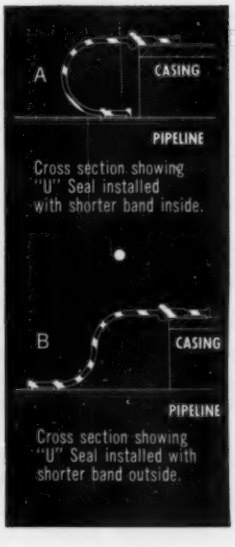
❶ "This new WmSon "U"-Seal maintains a tight seal regardless of what position the drag section assumes inside the casing."

THE NEW WmSON "U" SEAL

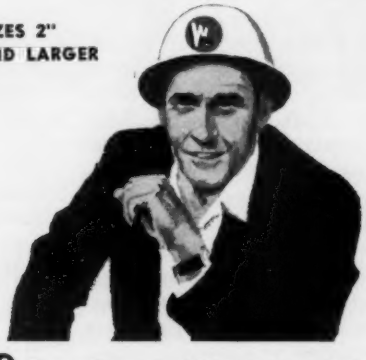


❷ "This is a special demonstrator to show the flexibility of the "U"-Seal. Notice how it maintains its seal regardless of the change in pipe position in relation to the casing."

❸ " . . . Here the "U"-Seal is shown installed in the new "U" shape with the shorter band inside , which allows extreme flexibility. The "U"-Seal can also be installed with the shorter band on the outside in WmSon's familiar "Z" shape. In either case, only a screwdriver is needed to tighten the two stainless steel bands."



SIZES 2" AND LARGER



❹ Regardless of which way you install the "U"-Seal (Fig. A or fig. B) . . . . Regardless of what position the drag section assumes . . .

YOU CAN SEAL WITH A "U"-SEAL!

●

Write Dept. C for Bulletin A-281

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REPRESENTATIVES AROUND THE WORLD

Washington • *Cont'd.*

from page 17

Chances are that there'll be no moves in Congress to specifically override the area-pricing plan. These two Texans aren't likely to air their soiled party linen in public unless forced to, these sources admit. But they hope to be able to get an agreement for modification from the White House, which would work through the new FPC.

A rumor was circulated just before the election that the Kennedy-Johnson ticket has promised to permit the gas-oil industry to virtually name two of the three new FPC commissioners in exchange for vote support and campaign contributions.

This is bitterly denied by officials of the party. Even Republican spokesmen agree that one commissioner at most, would be offered and that this is unlikely. What they believe may have been offered is that the new Administration will "clear" its appointments with the industry, although this too sounds unlikely to many political experts.

Another factor often overlooked in assessing the new Administration is the background and philosophy of the new Vice President. It is often assumed that because he is a Texan, a Southerner, a rancher, large landholder, and a businessman that he is at least moderately conservative. But his background, voting record, and activities during the campaign belie this.

He first came to Washington as a Roosevelt New Deal supporter, and hasn't changed except to attempt to win backing as an expert at negotiating compromise. Similarly, his fellow Texan, House Speaker Sam Rayburn, has also been a confirmed liberal since his early association with the New Deal.

Against this background, the industry's renewed efforts to get a natural gas "freedom" measure passed are nil. While it is undoubtedly good strategy to keep pressure on Congress by continuing to push the measure, there is no chance of success under the liberal Administration now in prospect.

Even if the new President did not have a record of opposing this legislation (voting against the 1956 Harris-Fulbright Bill), he has favored creation of the gas-industry-opposed fuels policy study.

Such a study is virtually certain now to be set up this year, either by Congress or within the Kennedy Administration. It would take as long as two years, and under the circumstances, would not be expected to recommend any measures that the gas industry would support. Just as certain in the final recommendations will be urgings that Congress pass a law, or the FPC adopt administratively, bans against pipeline sales directly to industrial customers at prices less than full cost-of-service levels.

Of all the industry problems, the only one which now *appears* safe is depletion. Sam Rayburn has definitely come out in favor of the present 27½ per cent rate for gas and oil.

But this too could change overnight. A full study of the tax laws, started last year by the House Ways and Means Committee and due to continue, could easily come up with recommendations for cutting this rate, which Speaker Rayburn would find "put the depletion controversy in a new light and requires some adjustment."

This would probably be at least two years away.

One other major program of the new Administration will vitally affect the gas industry. This is the plan now being developed under a special study commission to revamp the entire regulatory agency process.

Its first recommendation will probably be to support a measure introduced late in the last session of Congress to clamp tight restrictions on contacts between industry executives and members of these commissions, which includes the FPC.

The study Commission Chairman, James M. Landis, a former member of one regulatory agency, has already expressed support for a super transportation department, to replace all agencies which now deal with trains, trucks, air lines, and probably pipelines.

Before it's through, the study group will probably also have some far-reaching suggestions for changing FPC procedure. It should be noted that Mr. Landis, appointed by President-elect Kennedy, has long been an advocate of "tough" government regulation of utilities, and strong "consumer protection."

Thus, the outlook for the gas industry on gas legislation, area pricing, fuels policy, and government regulation in general is not bright as a result of the election.

Area pricing under fire

THE Federal Power Commission's new area-pricing system is not sitting too well with the gas industry.

In the first month after it was announced, the complaints were general in most cases, citing what the producers, pipeliners and distributors considered errors of omission.

In the second month, the industry got down to specifics and what it contends are errors of commission.

Most intensely challenged is the dual-price system. It took only 60 days before more than a dozen companies asked the commission to wipe out the two-price system in producing areas. Phillips Petroleum Co. was the first to demand that the existing price levels in the Permian basin be eliminated. A couple of days later, a dozen more firms asked that the existing price ceilings be knocked out for all areas.

Phillips is arguing that the system creates inequities and injuries. They're bringing "strangulation of casinghead gas supplies to existing plants" and cutting volumes of residue gas available from those plants for pipelines other than Transwestern Gas Pipeline Co., the firm says.

The other companies, which include Continental Oil Co., Hunt Oil Co., Shell Oil Co., Sinclair Oil & Gas Co., Texaco Inc., and Tidewater Oil Co., among others, use a slightly less severe approach.

They agree that some flexibility is needed in pricing, but contend that dual-pricing must be only a "guideline" in setting prices. Producers need the right to justify each price, they add.

The two-price system in the producing areas was recognized as only temporary by the commission when it announced its landmark

area pricing policy in late September. But it indicated it would take some time, perhaps years, for the situation which it envisioned as necessary for developing a single-price policy to develop.

But the industry wants action now.

Richfield ruling stands

THE U. S. Supreme Court has settled one fight over natural gas regulation. It has upheld a California Supreme Court ruling that a gas producer who sells to a single industrial customer has not dedicated its reserves to public use and thus is outside regulation under state law.

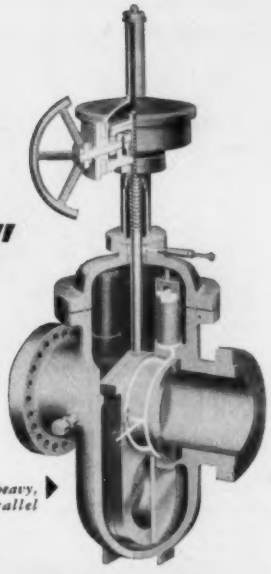
The high court, giving no opinion, simply upheld the State Supreme Court. Involved is a contract between Richfield Oil Corp., and Southern California Edison Co., in which Richfield supplies gas to the Edison Mandalay Steam Plant at Ventura, Calif.

When the contract was signed in 1959, and deliveries started later that year, Southern Counties Gas Co. complained to the State Public Utilities Commission that Richfield was operating illegally, without a permit. The PUC agreed, but Richfield appealed.

In urging the Appeals Court decision be reversed, the PUC contended the arrangement "can only have a catastrophic effect upon the rates paid by gas consumers in California." It complained that gas distributors, such as Southern Counties, must have interruptible customers like Edison in order to sell excess gas in low demand periods, and if these large customers are siphoned off by contracts such as that between Richfield and Edison, the small user will have to pay more.

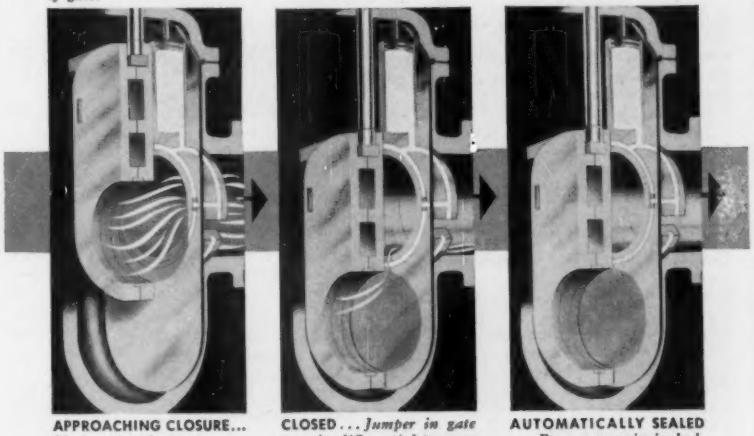
The distributor also argued that no dedication to public use is necessary for a permit to be required. But if it was, Richfield agreed when seeking a permit from the U. S. Agriculture Department to pass through a national park to operate the line as a common carrier, it added. But the State Court said the line only agreed to operate as a common carrier in the future if required, but was not doing so in transmitting gas to Edison. ■

NEW ADVANTAGES "GO ON THE LINE" with DARLING-McEVOY Conduit Valves



RIGHT: *Cutaway showing heavy, self-aligning gate and parallel seat assembly.*

BELOW: *diagrams of closure action on downstream side of gate.*



APPROACHING CLOSURE... *No loss of sealant.*

CLOSED... *Jumper in gate permits differential pressure to feed sealant into seat groove.*

AUTOMATICALLY SEALED *...Pressures again in balance. Tightness established.*

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2. NON-DIRECTIONAL FLOW
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4. NEGLIGIBLE SERVICING
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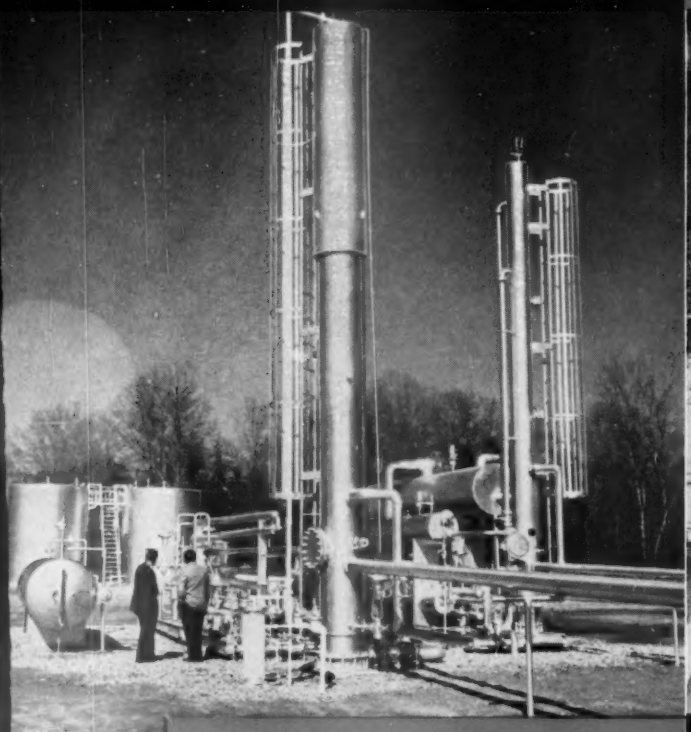

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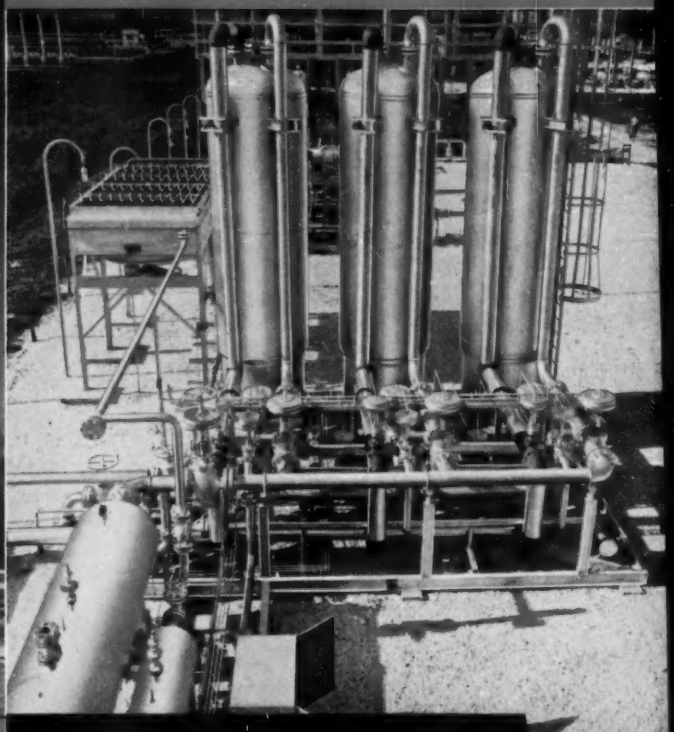

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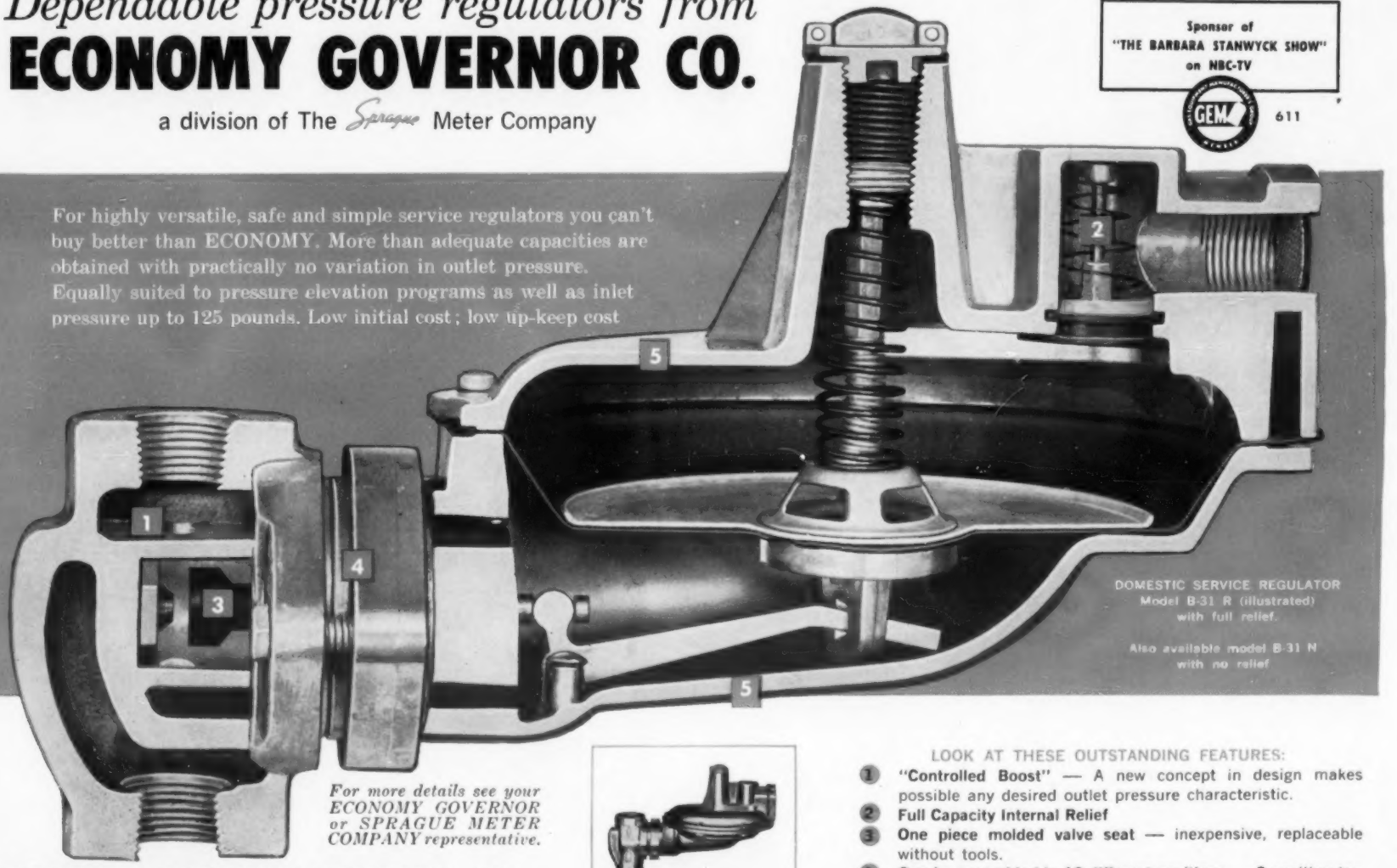

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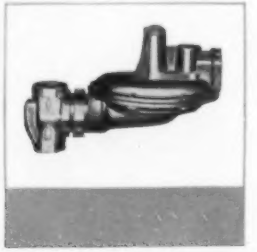

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